

# PUBLICATIONS

## PROFESSOR K. KOMVOPOULOS

### A. REFEREED PUBLICATIONS

#### A.1. Archival Journals

- [1] Komvopoulos, K., Saka, N., and Suh, N. P., “The Mechanism of Friction in Boundary Lubrication,” *Journal of Tribology*, ASME Trans., Vol. 107, No. 4, 1985, pp. 452–462.
- [2] Komvopoulos, K., Saka, N., and Suh, N. P., “Plowing Friction in Dry and Lubricated Metal Sliding,” *Journal of Tribology*, ASME Trans., Vol. 108, No. 3, 1986, pp. 301–313.
- [3] Komvopoulos, K., Suh, N. P., and Saka, N., “Wear of Boundary-Lubricated Metal Surfaces,” *Wear*, Vol. 107, No. 2, 1986, pp. 107–132.
- [4] Komvopoulos, K., Saka, N., and Suh, N. P., “The Significance of Oxide Layers in Boundary Lubrication,” *Journal of Tribology*, ASME Trans., Vol. 108, No. 4, 1986, pp. 502–513.
- [5] Komvopoulos, K., Saka, N., and Suh, N. P., “The Role of Hard Layers in Lubricated and Dry Sliding,” *Journal of Tribology*, ASME Trans., Vol. 109, No. 2, 1987, pp. 223–231.
- [6] Komvopoulos, K., “Finite Element Analysis of a Layered Elastic Solid in Normal Contact With a Rigid Surface,” *Journal of Tribology*, ASME Trans., Vol. 110, No. 3, 1988, pp. 477–485.
- [7] Komvopoulos, K., “Elastic-Plastic Finite Element Analysis of Indented Layered Media,” *Journal of Tribology*, ASME Trans., Vol. 111, No. 3, 1989, pp. 430–439.
- [8] Komvopoulos, K., and Nagarathnam, K., “Processing and Characterization of Laser-Cladded Coating Materials,” *Journal of Engineering Materials and Technology*, ASME Trans., Vol. 112, No. 2, 1990, pp. 131–143.
- [9] Murthy, A. K., Komvopoulos, K., and Brown, S. D., “Processing and Characterization of Multi-Layered Wear-Resistant Ceramic Coatings,” *Journal of Engineering Materials and Technology*, ASME Trans., Vol. 112, No. 2, 1990, pp. 164–174.
- [10] Komvopoulos, K., “Sliding Friction Mechanisms of Boundary-Lubricated Layered Surfaces: Part I-Basic Mechanical Aspects and Experimental Results,” *Tribology Transactions*, Vol. 34, No. 2, 1991, pp. 266–280.
- [11] Komvopoulos, K., “Sliding Friction Mechanisms of Boundary-Lubricated Layered Surfaces: Part II-Theoretical Analysis,” *Tribology Transactions*, Vol. 34, No. 2, 1991, pp. 281–291.
- [12] Komvopoulos, K., and Erpenbeck, S. A., “Finite Element Modeling of Orthogonal Metal Cutting,” *Journal of Engineering for Industry*, ASME Trans., Vol. 113, No. 3, 1991, pp. 253–267.
- [13] Komvopoulos, K., and Li, H., “The Effect of Tribofilm Formation and Humidity on the Friction and Wear Properties of Ceramic Materials,” *Journal of Tribology*, ASME Trans., Vol. 114, No. 1, 1992, pp. 131–140.
- [14] Komvopoulos, K., “Processing Effects on Microstructural Characteristics and Properties of Reactively Ion-Plated Titanium Nitride Coatings,” *Journal of the American Ceramic Society*, Vol. 75, No. 4, 1992, pp. 854–863.
- [15] Komvopoulos, K., and Choi, D.-H., “Elastic Finite Element Analysis of Multi-Asperity Contacts,” *Journal of Tribology*, ASME Trans., Vol. 114, No. 4, 1992, pp. 823–831.
- [16] Kral, E. R., Komvopoulos, K., and Bogy, D. B., “Elastic-Plastic Finite Element Analysis of Repeated Indentation of a Half-Space by a Rigid Sphere,” *Journal of Applied Mechanics*, ASME Trans., Vol. 60, No. 4, 1993, pp. 829–841.

- [17] Nagarathnam, K., and Komvopoulos, K., "Microstructural Characterization and *In Situ* Transmission Electron Microscopy Analysis of Laser-Processed and Thermally Treated Fe-Cr-W-C Clad Coatings," *Metallurgical Transactions A*, Vol. 24A, No. 7, 1993, pp. 1621–1629.
- [18] Feng, Z., Komvopoulos, K., Brown, I. G., and Bogy, D. B., "Effect of Graphitic Carbon Films on Diamond Nucleation by Microwave-Plasma-Enhanced Chemical-Vapor Deposition," *Journal of Applied Physics*, Vol. 74, No. 4, 1993, pp. 2841–2849.
- [19] Kral, E. R., Komvopoulos, K., and Bogy, D. B., "Finite Element Analysis of Repeated Indentation of an Elastic-Plastic Layered Medium by a Rigid Sphere, Part I: Surface Results," *Journal of Applied Mechanics*, ASME Trans., Vol. 62, No. 1, 1995, pp. 20–28.
- [20] Kral, E. R., Komvopoulos, K., and Bogy, D. B., "Finite Element Analysis of Repeated Indentation of an Elastic-Plastic Layered Medium by a Rigid Sphere, Part II: Subsurface Results," *Journal of Applied Mechanics*, ASME Trans., Vol. 62, No. 1, 1995, pp. 29–42.
- [21] Komvopoulos, K., "Effect of Process Parameters on the Microstructure, Geometry and Microhardness of Laser-Clad Coating Materials," *Materials Science Forum*, Vol. 163-165, 1994, pp. 417–422.
- [22] Wang, S., and Komvopoulos, K., "A Fractal Theory of the Interfacial Temperature Distribution in the Slow Sliding Regime: Part I—Elastic Contact and Heat Transfer Analysis," *Journal of Tribology*, ASME Trans., Vol. 116, No. 4, 1994, pp. 812–823.
- [23] Wang, S., and Komvopoulos, K., "A Fractal Theory of the Interfacial Temperature Distribution in the Slow Sliding Regime: Part II—Multiple Domains, Elastoplastic Contacts and Applications," *Journal of Tribology*, ASME Trans., Vol. 116, No. 4, 1994, pp. 824–832.
- [24] Feng, Z., Komvopoulos, K., Brown, I. G., and Bogy, D. B., "A Pretreatment Process for Enhanced Diamond Nucleation on Smooth Silicon Substrates Coated with Hard Carbon Films," *Journal of Materials Research*, Vol. 9, No. 8, 1994, pp. 2148–2153.
- [25] Komvopoulos, K., Wei, B., Anders, S., Anders, A., and Brown, I. G., "Surface Modification of Magnetic Recording Heads by Plasma Immersion Ion Implantation and Deposition," *Journal of Applied Physics*, Vol. 76, No. 3, 1994, pp. 1656–1664.
- [26] Feng, Z., Brewer, M. A., Komvopoulos, K., Brown, I. G., and Bogy, D. B., "Diamond Nucleation on Unscratched Silicon Substrates Coated with Various Non-diamond Carbon Films by Microwave Plasma-Enhanced Chemical Vapor Deposition," *Journal of Materials Research*, Vol. 10, No. 1, 1995, pp. 165–174.
- [27] Anders, S., Anders, A., Brown, I. G., Wei, B., Komvopoulos, K., Ager III, J. W., and Yu, K. M., "Effect of Vacuum Arc Deposition Parameters on the Properties of Amorphous Carbon Thin Films," *Surface and Coatings Technology*, Vol. 68/69, 1994, pp. 388–393.
- [28] Alley, R. L., Komvopoulos, K., and Howe, R. T., "Self-Assembled Monolayer Film for Enhanced Imaging of Rough Surfaces with Atomic Force Microscopy," *Journal of Applied Physics*, Vol. 76, No. 10, 1994, pp. 5731–5737.
- [29] Wang, S., and Komvopoulos, K., "A Fractal Theory of the Temperature Distribution at Elastic Contacts of Fast Sliding Surfaces," *Journal of Tribology*, ASME Trans., Vol. 117, No. 2, 1995, pp. 203–215.
- [30] Wei, B., and Komvopoulos, K., "Nanoscale Indentation Hardness and Wear Characterization of Hydrogenated Carbon Thin Films," *Journal of Tribology*, ASME Trans., Vol. 118, No. 2, 1996, pp. 431–438.
- [31] Kral, E. R., Komvopoulos, K., and Bogy, D. B., "Hardness of Thin-Film Media: Scratch Experiments and Finite Element Simulations," *Journal of Tribology*, ASME Trans., Vol. 118, No. 1, 1996, pp. 1–11.
- [32] Nagarathnam, K., and Komvopoulos, K., "Microstructural and Microhardness Characteristics of Laser-Synthesized Fe-Cr-W-C Coatings," *Metallurgical and Materials Transactions A*, Vol. 26A, No. 8, 1995, pp. 2131–2139.
- [33] Nagarathnam, K., and Komvopoulos, K., "Microstructural Analysis and Oxidation Behavior of Laser-Processed Fe-Cr-Al-Y Alloy Coatings," *Metallurgical and Materials Transactions A*, Vol. 27A, No. 2, 1996, pp. 381–390.
- [34] Feng, Z., Komvopoulos, K., and Brown, I. G., "Effect of Amorphous Carbon Film Structure on Diamond Nucleation," *Journal of Applied Physics*, Vol. 78, No. 4, 1995, pp. 2720–2724.

- [35] Feng, Z., Komvopoulos, K., Bogy, D. B., Ager III, J. W., Anders, S., Anders, A., Wang, Z., and Brown, I. G., "Effect of Pretreatment Process Parameters on Diamond Nucleation on Unscratched Silicon Substrates Coated with Amorphous Carbon Films," *Journal of Applied Physics*, Vol. 79, No. 1, 1996, pp. 485–492.
- [36] Wei, B., Komvopoulos, K., and Brown, I. G., "Microstructure Modification of Amorphous Carbon Films by Ion-Implantation Techniques," *Journal of Materials Research*, Vol. 14, No. 5, 1999, pp. 2181–2190.
- [37] Cho, S.-S., and Komvopoulos, K., "Wear Mechanisms of Multi-Layer Coated Cemented Carbide Cutting Tools," *Journal of Tribology*, ASME Trans., Vol. 119, No. 1, 1997, pp. 8–17.
- [38] Wei, B., and Komvopoulos, K., "Friction and Wear Micromechanisms of Amorphous Carbon Thin Films," *Journal of Tribology*, ASME Trans., Vol. 119, No. 4, 1997, pp. 823–829.
- [39] Kral, E. R., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Surface Deformation and Stresses in an Elastic-Plastic Layered Medium Subjected to Indentation and Sliding Contact Loading," *Journal of Applied Mechanics*, ASME Trans., Vol. 63, No. 2, 1996, pp. 365–375.
- [40] Cho, S.-S., and Komvopoulos, K., "Cutting Force Variation Due to Wear of Multi-Layer Ceramic Coated Tools," *Journal of Tribology*, ASME Trans., Vol. 120, No. 1, 1998, pp. 75–81.
- [41] Cho, S.-S., and Komvopoulos, K., "Correlation Between Acoustic Emission and Wear of Multi-Layer Ceramic Coated Carbide Tools," *Journal of Manufacturing Science and Engineering*, ASME Trans., Vol. 119, No. 2, 1997, pp. 238–246.
- [42] Komvopoulos, K., "Subsurface Crack Mechanisms Under Indentation Loading," *Wear*, Vol. 199, No. 1, 1996, pp. 9–23.
- [43] Komvopoulos, K., and Cho, S.-S., "Finite Element Analysis of Subsurface Crack Propagation in a Half-Space Due to a Moving Asperity Contact," *Wear*, Vol. 209, No. 1-2, 1997, pp. 57–68.
- [44] Cho, S.-S., and Komvopoulos, K., "Thermoelastic Finite Element Analysis of Subsurface Cracking Due to Sliding Surface Traction," *Journal of Engineering Materials and Technology*, ASME Trans., Vol. 119, No. 1, 1997, pp. 71–78.
- [45] Kral, E. R., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Subsurface Stresses and Shakedown Due to Repeated Sliding on a Layered Medium," *Journal of Applied Mechanics*, ASME Trans., Vol. 63, No. 4, 1996, pp. 967–973.
- [46] Wang, S., and Komvopoulos, K., "Friction Force, Contact Resistance, and Lubricant Shear Behavior at the Magnetic Head-Disk Interface During Starting," *Journal of Tribology*, ASME Trans., Vol. 119, No. 4, 1997, pp. 830–839.
- [47] Feng, Z., Anders, S., Anders, A., Ager III, J. W., Brown, I. G., Komvopoulos, K., and Bogy, D. B., "Diamond Growth on Hard Carbon Films," *Diamond and Related Materials*, Vol. 5, No. 10, 1996, pp. 1080–1086.
- [48] Kral, E. R., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Subsurface Stress and Strain Fields Due to Sliding Contact on an Elastic-Plastic Layered Medium," *Journal of Tribology*, ASME Trans., Vol. 119, No. 2, 1997, pp. 332–341.
- [49] Komvopoulos, K., "Surface Engineering and Microtribology for Microelectromechanical Systems," *Wear*, Vol. 200, No. 1-2, 1996, pp. 305–327 (*invited*).
- [50] Komvopoulos, K., and Yan, W., "A Fractal Analysis of Stiction in Microelectromechanical Systems," *Journal of Tribology*, ASME Trans., Vol. 119, No. 3, 1997, pp. 391–400.
- [51] Yan, W., and Komvopoulos, K., "Three-Dimensional Molecular Dynamics Analysis of Atomic-Scale Indentation," *Journal of Tribology*, ASME Trans., Vol. 120, No. 2, 1998, pp. 385–392.
- [52] Wang, S., and Komvopoulos, K., "Static Friction and Initiation of Slip at Magnetic Head-Disk Interfaces," *Journal of Tribology*, ASME Trans., Vol. 122, No. 2, 2000, pp. 246–256.
- [53] Komvopoulos, K., and Yan, W., "Molecular Dynamics Simulation of Single and Repeated Indentation," *Journal of Applied Physics*, Vol. 82, No. 10, 1997, pp. 4823–4830.

- [54] Yan, W., and Komvopoulos, K., "Contact Analysis of Elastic-Plastic Fractal Surfaces," *Journal of Applied Physics*, Vol. 84, No. 7, 1998, pp. 3617–3624.
- [55] Komvopoulos, K., and Yan, W., "Three-Dimensional Elastic-Plastic Fractal Analysis of Surface Adhesion in Microelectromechanical Systems," *Journal of Tribology*, ASME Trans., Vol. 120, No. 4, 1998, pp. 808–813.
- [56] Klapperich, C., Komvopoulos, K., and Pruitt, L., "Tribological Properties and Microstructure Evolution of Ultra-High Molecular Weight Polyethylene," *Journal of Tribology*, ASME Trans., Vol. 121, No. 2, 1999, pp. 394–402.
- [57] Lu, W., and Komvopoulos, K., "Microstructure and Nanomechanical Properties of Nitrogenated Amorphous Carbon Thin Films Synthesized by Reactive Radio Frequency Sputtering," *Journal of Applied Physics*, Vol. 85, No. 5, 1999, pp. 2642–2651.
- [58] Ager III, J. W., Anders, S., Anders, A., Wei, B., Yao, X. Y., Brown, I. G., Bhatia, C. S., and Komvopoulos, K., "Ion Implantation Post-Processing of Amorphous Carbon Films," *Diamond and Related Materials*, Vol. 8, No. 2-5, 1999, pp. 451–456.
- [59] Lu, W., and Komvopoulos, K., "Dependence of Growth and Nanomechanical Properties of Ultrathin Amorphous Carbon Films on Radio Frequency Sputtering Conditions," *Journal of Applied Physics*, Vol. 86, No. 4, 1999, pp. 2268–2277.
- [60] Komvopoulos, K., "Head-Disk Interface Contact Mechanics for Ultrahigh Density Magnetic Recording," *Wear*, Vol. 238, No. 1, 2000, pp. 1–11.
- [61] Niederberger, S., Gracias, D. H., Komvopoulos, K., and Somorjai, G. A., "Transitions from Nanoscale to Microscale Dynamic Friction Mechanisms on Polyethylene and Silicon Surfaces," *Journal of Applied Physics*, Vol. 87, No. 6, 2000, pp. 3143–3150.
- [62] Lu, W., and Komvopoulos, K., "Implanted Argon Atoms as Sensing Probes of Residual Stress in Ultrathin Films," *Applied Physics Letters*, Vol. 76, No. 22, 2000, pp. 3206–3208.
- [63] Lu, W., and Komvopoulos, K., "Nanotribological and Nanomechanical Properties of Ultrathin Amorphous Carbon Films Synthesized by Radio Frequency Sputtering," *Journal of Tribology*, ASME Trans., Vol. 123, No. 3, 2001, pp. 641–650.
- [64] Komvopoulos, K., and Xu, T., "Transmission Electron Microscopy Study of Diamond Nucleation and Growth on Smooth Silicon Surfaces Coated with a Thin Amorphous Carbon Film," *Diamond and Related Materials*, Vol. 9, No. 3-6, 2000, pp. 274–282.
- [65] Klapperich, C., Komvopoulos, K., and Pruitt, L., "Nanomechanical Properties of Polymers Determined from Nanoindentation Experiments," *Journal of Tribology*, ASME Trans., Vol. 123, No. 3, 2001, pp. 624–631.
- [66] Lu, W., and Komvopoulos, K., "Nanomechanical and Nanotribological Properties of Carbon, Chromium, and Titanium Carbide Ultrathin Films," *Journal of Tribology*, ASME Trans., Vol. 123, No. 4, 2001, pp. 717–724.
- [67] Kim, S. M., Sit, C. Y., Komvopoulos, K., Yamaguchi, E. S., and Ryason, P. R., "Boundary Lubrication of Steel Surfaces with Borate, Phosphorus, and Sulfur Containing Lubricants at relatively Low and Elevated Temperatures," *Tribology Transactions*, Vol. 43, No. 4, 2000, pp. 569–578.
- [68] Komvopoulos, K., and Ye, N., "Three-Dimensional Contact Analysis of Elastic-Plastic Layered Media With Fractal Surface Topographies," *Journal of Tribology*, ASME Trans., Vol. 123, No. 3, 2001, pp. 632–640.
- [69] Mailhot, B., Komvopoulos, K., Ward, B., Tian, Y., and Somorjai, G. A., "Microstructure Effects on Adhesion, Hardness, Elastic Modulus and Friction of Thermoplastic Polyurethanes Determined by Scanning Force Microscopy," *Journal of Applied Physics*, Vol. 89, No. 10, 2001, pp. 5712–5719.
- [70] Lu, W., Komvopoulos, K., and Yeh, S. W., "Stability of Ultrathin Amorphous Carbon Films Deposited on Smooth Silicon Substrates by Radio Frequency Sputtering," *Journal of Applied Physics*, Vol. 89, No. 4, 2001, pp. 2422–2433.

- [71] Klapperich, C., Pruitt, L., and Komvopoulos, K., "Chemical and Biological Characteristics of Low-Temperature Plasma Treated Ultra-High Molecular Weight Polyethylene for Biomedical Applications," *Journal of Materials Science: Materials in Medicine*, Vol. 12, No. 6, 2001, pp. 549–556.
- [72] Komvopoulos, K., "Plasma-Enhanced Surface Modification of Low Linear-Density Polyethylene Catheters," *Journal of Mechanics in Medicine and Biology*, Vol. 1, No. 1, 2001, pp. 17–31.
- [73] Klapperich, C., Pruitt, L., and Komvopoulos, K., "Nanomechanical Properties of Energetically Treated Polyethylene Surfaces," *Journal of Materials Research*, Vol. 17, No.2, 2002, pp. 423–430.
- [74] Sun, X., Horowitz, R., and Komvopoulos, K., "Stability and Resonance Analysis of a Phase-Locked Loop Natural Frequency Tracking System for MEMS Fatigue Testing," *Journal of Dynamic Systems, Measurement, and Control*, Vol. 124, No. 4, 2002, pp. 599–605.
- [75] Amitay-Sadovskiy, E., Ward, B., Somorjai, G. A., and Komvopoulos, K., "Nanomechanical Properties and Morphology of Thick Polyurethane Films Under Contact Pressure and Stretching," *Journal of Applied Physics*, Vol. 91, No. 1, 2002, pp. 375–381.
- [76] Lu, W., and Komvopoulos, K., "Effect of Stress-Induced Phase Transformation on Nanomechanical Properties of Sputtered Amorphous Carbon Films," *Applied Physics Letters*, Vol. 82, No. 15, 2003, pp. 2437–2439.
- [77] Komvopoulos, K., and Ye, N., "Elastic-Plastic Finite Element Analysis for the Head-Disk Interface With Fractal Topography Description," *Journal of Tribology*, ASME Trans., Vol. 124, No. 4, 2002, pp. 775–784.
- [78] Amitay-Sadovskiy, E., Komvopoulos, K., Tian, Y., and Somorjai, G. A., "Correlation of Surface Molecular Composition to Nanoscale Elastic Behavior and Topography of Stretched Polyurethane Films," *Applied Physics Letters*, Vol. 80, No. 10, 2002, pp. 1829–1831.
- [79] Lu, W., Komvopoulos, K., Patsalas, P., Charitidis, C., Gioti, M., and Logothetidis, S., "Microstructure and Nanomechanical and Optical Properties of Single- and Multi-Layer Carbon Films Synthesized by Radio Frequency Sputtering," *Surface and Coatings Technology*, Vol. 168, No. 1, 2003, pp. 12–22.
- [80] Gong, Z.-Q., and Komvopoulos, K., "Effect of Surface Patterning on Contact Deformation of Elastic-Plastic Layered Media," *Journal of Tribology*, ASME Trans., Vol. 125, No. 1, 2003, pp. 16–24.
- [81] Ye, N., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Elastic-Plastic Layered Media Under Thermomechanical Surface Loading," *Journal of Tribology*, ASME Trans., Vol. 125, No. 1, 2003, pp. 52–59.
- [82] Komvopoulos, K., Chiaro, V., Pakter, B., Yamaguchi, E. S., and Ryason, P. R., "Antiwear Film Formation on Steel Surfaces Lubricated With Gear Oils Containing Borate, Phosphorus, and Sulfur Additives," *Tribology Transactions*, Vol. 45, No. 4, 2002, pp. 568–575.
- [83] Komvopoulos, K., "Adhesion and Friction Forces in Microelectromechanical Systems: Mechanisms, Measurement, Surface Modification Techniques, and Adhesion Theory," *Journal of Adhesion Science and Technology*, Vol. 17, No. 4, 2003, pp. 477–517 (*invited*).
- [84] Ye, N., and Komvopoulos, K., "Effect of Residual Stress in Surface Layer on Contact Deformation of Elastic-Plastic Layered Media," *Journal of Tribology*, ASME Trans., Vol. 125, No. 4, 2003, pp. 692–699.
- [85] Ye, N., and Komvopoulos, K., "Indentation Analysis of Elastic-Plastic Homogeneous and Layered Media: Criteria for Determining the Real Material Hardness," *Journal of Tribology*, ASME Trans., Vol. 125, No. 4, 2003, pp. 685–691.
- [86] Amitay-Sadovskiy, E., Komvopoulos, K., Ward, R., and Somorjai, G. A., "Surface Reordering of Stretched Polyurethane Block Copolymer Films Studied by Sum Frequency Generation Vibrational Spectroscopy," *Journal of Physical Chemistry B*, Vol. 107, No. 26, 2003, pp. 6377–6383.
- [87] Amitay-Sadovskiy, E., Komvopoulos, K., Ward, R., and Somorjai, G. A., "Effects of Copolymer Segment Length and Reversible Deformation on the Molecular Surface Structure of Polyurethane," *Applied Physics Letters*, Vol. 83, No. 15, 2003, pp. 3066–3068.
- [88] Ma, X.-G., Komvopoulos, K., Wan, D., Bogy, D. B., and Kim, Y.-S., "Effects of Film Thickness and Contact Load on Nanotribological Properties of Sputtered Amorphous Carbon Thin Films," *Wear*, Vol. 254, No. 10, 2003, pp. 1010–1018.

- [89] Chimmalgi, A., Choi, T. Y., Grigoropoulos, C. P., and Komvopoulos, K., “Femtosecond Laser Aperturless Near-Field Nanomachining of Metals Assisted by Scanning Probe Microscopy,” *Applied Physics Letters*, Vol. 82, No. 8, 2003, pp. 1146–1148.
- [90] Gong, Z.-Q., and Komvopoulos, K., “Mechanical and Thermomechanical Elastic-Plastic Contact Analysis of Layered Media With Patterned Surfaces,” *Journal of Tribology*, ASME Trans., Vol. 126, No. 1, 2004, pp. 9–17.
- [91] Kogut, L., and Komvopoulos, K., “Analysis of the Spherical Indentation Cycle for Elastic-Perfectly Plastic Solids,” *Journal of Materials Research*, Vol. 19, No. 12, 2004, pp. 3641–3653.
- [92] Komvopoulos, K., Do, V., Yamaguchi, E. S., and Ryason, P. R., “Effect of Sulfur- and Phosphorus-Containing Additives and Metal Deactivator on the Tribological Properties of Boundary-Lubricated Steel Surfaces,” *Tribology Transactions*, Vol. 46, No. 3, 2003, pp. 315–325.
- [93] Zhou, J., Chakravartula, A., Pruitt, L., and Komvopoulos, K., “Tribological and Nanomechanical Properties of Unmodified and Crosslinked Ultra-High Molecular Weight Polyethylene for Total Joint Replacements,” *Journal of Tribology*, ASME Trans., Vol. 126, No. 2, 2004, pp. 386–394.
- [94] Yang, J., and Komvopoulos, K., “Dynamic Indentation of an Elastic-Plastic Multi-Layered Medium by a Rigid Cylinder,” *Journal of Tribology*, ASME Trans., Vol. 126, No. 1, 2004, pp. 18–27.
- [95] Kogut, L., and Komvopoulos, K., “Electrical Contact Resistance of Elastic-Plastic Rough Surfaces,” *Journal of Applied Physics*, Vol. 94, No. 5, 2003, pp. 3153–3162.
- [96] Kogut, L., and Komvopoulos, K., “Analysis of Interfacial Adhesion Based on Electrical Contact Resistance Measurements,” *Journal of Applied Physics*, Vol. 94, No. 10, 2003, pp. 6386–6390.
- [97] Gong, Z.-Q., and Komvopoulos, K., “Surface Cracking in Elastic-Plastic Multi-Layered Media Due to Repeated Sliding Contact,” *Journal of Tribology*, ASME Trans., Vol. 126, No. 4, 2004, pp. 655–663.
- [98] Ma, X.-G., and Komvopoulos, K., “Nanoscale Pseudoelastic Behavior of Indented Titanium-Nickel Films,” *Applied Physics Letters*, Vol. 83, No. 18, 2003, pp. 3773–3775; *Virtual Journal of Nanoscale Science and Technology*, Vol. 8, No. 19, November 10, 2003.
- [99] Kogut, L., and Komvopoulos, K., “Electrical Contact Resistance Theory for Conductive Rough Surfaces Separated by a Thin Insulating Film,” *Journal of Applied Physics*, Vol. 95, No. 2, 2004, pp. 576–585.
- [100] Yang, J., and Komvopoulos, K., “A Molecular Dynamics Analysis of Surface Interference and Tip Shape and Size Effects on Atomic-Scale Friction,” *Journal of Tribology*, ASME Trans., Vol. 127, No. 3, 2005, pp. 513–521.
- [101] Komvopoulos, K., Do, V., Yamaguchi, E. S., Yeh, S. W., and Ryason, P. R., “X-ray Photoelectron Spectroscopy Analysis of Antiwear Tribofilms Produced on Boundary-Lubricated Steel Surfaces from Sulfur- and Phosphorus-Containing Additives and Metal Deactivator Additive,” *Tribology Transactions*, Vol. 47, No. 3, 2004, pp. 321–327.
- [102] Wan, D., and Komvopoulos, K., “Probabilistic Analysis of Tetrahedral Carbon Hybridization in Amorphous Carbon Films,” *Applied Physics Letters*, Vol. 88, No. 20, 2006, pp. 221908(1–3).
- [103] Ma, X.-G., and Komvopoulos, K., “Pseudoelasticity of Shape-Memory Titanium-Nickel Films Subjected to Dynamic Nanoindentation,” *Applied Physics Letters*, Vol. 84, No. 21, 2004, pp. 4274–4276; *Virtual Journal of Nanoscale Science and Technology*, Vol. 9, No. 20, May 24, 2004.
- [104] Kogut, L., and Komvopoulos, K., “Electromechanically Induced Transition from Nonohmic to Ohmic Behavior at Contact Interfaces,” *Applied Physics Letters*, Vol. 84, No. 24, 2004, pp. 4842–4844; *Virtual Journal of Nanoscale Science and Technology*, Vol. 9, No. 22, June 7, 2004.
- [105] Lumbantobing, A., Kogut, L., and Komvopoulos, K., “Electrical Contact Resistance as a Diagnostic Tool for MEMS Contact Interfaces,” *Journal of Microelectromechanical Systems*, Vol. 13, No. 6, 2004, pp. 977–987.
- [106] Wan, D., and Komvopoulos, K., “Thickness Effect on Thermally-Induced Phase Transformations in Sputtered Titanium-Nickel Shape-Memory Films,” *Journal of Materials Research*, Vol. 20, No. 6, 2005, pp. 1606–1612.
- [107] Lumbantobing, A., and Komvopoulos, K., “Static Friction in Polysilicon Surface Micromachines,” *Journal of Microelectromechanical Systems*, Vol. 14, No. 4, 2005, pp. 651–663.

- [108] Gong, Z.-Q., and Komvopoulos, K., "Thermomechanical Analysis of Semi-infinite Solid in Sliding Contact With a Fractal Surface," *Journal of Tribology*, ASME Trans., Vol. 127, No. 2, 2005, pp. 331–342.
- [109] Wan, D., and Komvopoulos, K., "Formation of Diamondlike Nanocrystallites in Amorphous Carbon Films Synthesized by Radio-Frequency Sputtering," *Journal of Materials Research*, Vol. 23, No. 3, 2008, pp. 700–703.
- [110] Ma, X.-G., Komvopoulos, K., and Bogy, D. B., "Nanoindentation of Polycrystalline Silicon-Carbide Thin Films Studied by Acoustic Emission," *Applied Physics Letters*, Vol. 85, No. 10, 2004, pp. 1695–1697; *Virtual Journal of Nanoscale Science and Technology*, Vol. 10, No. 13, September 27, 2004.
- [111] Wan, D., and Komvopoulos, K., "Transmission Electron Microscopy and Electron Energy Loss Spectroscopy Analysis of Ultrathin Amorphous Carbon Films," *Journal of Materials Research*, Vol. 19, No. 7, 2004, pp. 2131–2136.
- [112] Yang, J., and Komvopoulos, K., "Impact of a Rigid Sphere on an Elastic Homogeneous Half-Space," *Journal of Tribology*, ASME Trans., Vol. 127, No. 2, 2005, pp. 325–330.
- [113] Zhou, J., and Komvopoulos, K., "Wear Mechanisms of Untreated and Gamma Irradiated Ultra-High Molecular Weight Polyethylene for Total Joint Replacements," *Journal of Tribology*, ASME Trans., Vol. 127, No. 2, 2005, pp. 273–279.
- [114] Yang, J., and Komvopoulos, K., "A Mechanics Approach to Static Friction of Elastic-Plastic Fractal Surfaces," *Journal of Tribology*, ASME Trans., Vol. 127, No. 2, 2005, pp. 315–324.
- [115] Komvopoulos, K., Do, V., Yamaguchi, E. S., and Ryason, P. R., "Nanomechanical and Nanotribological Properties of an Antiwear Tribofilm Produced from Phosphorus-Containing Additives on Boundary-Lubricated Steel Surfaces," *Journal of Tribology*, ASME Trans., Vol. 126, No. 4, 2004, pp. 775–780.
- [116] Komvopoulos, K., Pernama, S. A., Ma, J., Yamaguchi, E. S., and Ryason, P. R., "Synergistic Effects of Boron-, Sulfur, and Phosphorus-Containing Lubricants in Boundary Lubrication of Steel Surfaces," *Tribology Transactions*, Vol. 48, No. 2, 2005, pp. 218–229.
- [117] Gong, Z.-Q., and Komvopoulos, K., "Contact Fatigue Analysis of an Elastic-Plastic Layered Medium With a Surface Crack in Sliding Contact With a Fractal Surface," *Journal of Tribology*, ASME Trans., Vol. 127, No. 3, 2005, pp. 503–512.
- [118] Timpe, S. J., and Komvopoulos, K., "An Experimental Study of Sidewall Adhesion in Microelectromechanical Systems," *Journal of Microelectromechanical Systems*, Vol. 14, No. 6, 2005, pp. 1356–1363.
- [119] Kogut, L., and Komvopoulos, K., "Analytical Current-Voltage Relationships for Electron Tunneling Across Rough Interfaces," *Journal of Applied Physics*, Vol. 97, No. 7, 2005, pp. 073701(1–5).
- [120] Chimmalgi, A., Grigoropoulos, C. P., and Komvopoulos, K., "Surface Nanostructuring by Nano-/Femtosecond Laser-Assisted Scanning Force Microscopy," *Journal of Applied Physics*, Vol. 97, No. 10, 2005, pp. 104319(1–12).
- [121] Komvopoulos, K. and Yang, J., "Dynamic Analysis of Single and Cyclic Indentation of an Elastic-Plastic Multi-Layered Medium by a Rigid Fractal Surface," *Journal of the Mechanics and Physics of Solids*, Vol. 54, No. 5, 2006, pp. 927–950.
- [122] Kveskin, S. J., Komvopoulos, K., and Somorjai, G. A., "Molecular Restructuring of Poly(methyl methacrylate) and Poly(butyl methacrylate) Surfaces Due to Compression by a Sapphire Prism Studied by Infrared-Visible Sum Frequency Generation Vibrational Spectroscopy," *Langmuir*, Vol. 21, No. 8, 2005, pp. 3647–3652.
- [123] Ma, X.-G., and Komvopoulos, K., "In Situ Transmission Electron Microscopy and Nanoindentation Studies of Phase Transformation and Pseudoelasticity of Shape-Memory Titanium-Nickel Films," *Journal of Materials Research*, Vol. 20, No. 7, 2005, pp. 1808–1813.
- [124] Kogut, L., and Komvopoulos, K., "Breakdown of Ultrathin Native Oxide Films at Contact Interfaces of Electromechanically Stressed Silicon Microdevices," *Journal of Applied Physics*, Vol. 97, No. 12, 2005, pp. 124102(1–5).
- [125] Zhang, H.-S., and Komvopoulos, K., "Nanoscale Pseudoelasticity of Single-Crystal Cu-Al-Ni Shape-Memory Alloy Induced by Cyclic Nanoindentation," *Journal of Materials Science*, Vol. 41, No. 15, 2006, pp. 5021–5024.

- [126] Tajima, S., and Komvopoulos, K., "Surface Modification of Low-Density Polyethylene by Inductively Coupled Argon Plasma," *Journal of Physical Chemistry B*, Vol. 109, No. 37, 2005, pp. 17623–17629.
- [127] Mailhot, B., Rivaton, A., Gardette, J.-L., Moustaghfir, A., Tomasella, E., Jacquet, M., Ma, X.-G., and Komvopoulos, K., "Enhancement of the Photoprotection and Nanomechanical Properties of Polycarbonate by Deposition of Thin Ceramic Coatings," *Journal of Applied Physics*, Vol. 99, No. 10, 2006, pp. 104310(1–7).
- [128] Xu, R., and Komvopoulos, K., "A Reduced-Order Dynamic Model of Nonlinear Oscillating Devices," *Journal of Dynamic Systems, Measurement and Control*, ASME Trans., Vol. 129, No. 4, 2007, pp. 514–521.
- [129] Komvopoulos, K., and Gong, Z.-Q., "Stress Analysis of a Layered Elastic Solid in Contact with a Rough Surface Exhibiting Fractal Behavior," *International Journal of Solids and Structures*, Vol. 44, No. 7-8, 2007, pp. 2109–2129.
- [130] Tajima, S., and Komvopoulos, K., "Effect of Ion Energy Fluence on the Topography and Wettability of Low-Density Polyethylene Exposed to Inductively Coupled Argon Plasma," *Journal of Physics D: Applied Physics*, Vol. 39, No. 6, 2006, pp. 1084–1094.
- [131] Komvopoulos, K., Pernama, S. A., Yamaguchi, E. S., and Ryason, P. R., "Friction Reduction and Antiwear Capacity of Engine Oils Containing Zinc Dialkyl Dithiophosphate and Molybdenum-Complex Additives," *Tribology Transactions*, Vol. 49, No. 2, 2006, pp. 151–156.
- [132] KweSkin, S. J., Komvopoulos, K., and Somorjai, G. A., "Entropically Mediated Polyolefin Blend Segregation at Buried Sapphire and Air Interfaces Investigated by Infrared-Visible Sum Frequency Generation Vibrational Spectroscopy," *Journal of Physical Chemistry B*, Vol. 109, No. 49, 2005, pp. 23415–23418.
- [133] Komvopoulos, K., and Ma, X.-G., "Pseudoelasticity of Martensitic Titanium-Nickel Shape-Memory Films Studied by *In Situ* Heating Nanoindentation and Transmission Electron Microscopy," *Applied Physics Letters*, Vol. 87, No. 26, 2005, pp. 263108(1–3).
- [134] KweSkin, S. J., Komvopoulos, K., and Somorjai, G. A., "Conformational Changes at Polymer Gel Interfaces upon Saturation with Various Liquids Studied by Infrared-Visible Sum Frequency Generation Vibrational Spectroscopy," *Applied Physics Letters*, Vol. 88, No. 13, 2006, pp. 134105(1–3).
- [135] Wan, D., and Komvopoulos, K., "Effect of Low-Pressure Plasma Discharge Conditions on the Thickness and Roughness of Ultrathin Films of Amorphous Carbon," *Journal of Applied Physics*, Vol. 100, No. 6, 2006, pp. 063307(1–7).
- [136] Chakravartula, A., and Komvopoulos, K., "Viscoelastic Properties of Polymer Surfaces Investigated by Nanoscale Dynamic Mechanical Analysis," *Applied Physics Letters*, Vol. 88, No. 13, 2006, pp. 131901(1–3); *Virtual Journal of Nanoscale Science and Technology*, Vol. 13, No. 14, April 10, 2006.
- [137] Zhou, J., Komvopoulos, K., and Minor, A. M., "Nanoscale Plastic Deformation and Fracture of Polymers Studied by *In Situ* Nanoindentation in a Transmission Electron Microscope," *Applied Physics Letters*, Vol. 88, No. 18, 2006, pp. 181908(1–3).
- [138] Timpe, S. J., and Komvopoulos, K., "The Effect of Adhesion on the Static Friction Properties of Sidewall Contact Interfaces of Microelectromechanical Devices," *Journal of Microelectromechanical Systems*, Vol. 15, No. 6, 2006, pp. 1612–1621.
- [139] KweSkin, S. J., Rioux, R. M., Habas, S. E., Komvopoulos, K., Yang, P., and Somorjai, G. A., "Carbon Monoxide Adsorption and Oxidation on Monolayer Films of Cubic Platinum Nanoparticles Investigated by Infrared-Visible Sum Frequency Generation Vibrational Spectroscopy," *Journal of Physical Chemistry B*, Vol. 110, No. 32, 2006, pp. 15920–15925.
- [140] Tajima, S., and Komvopoulos, K., "Effect of Reactive Species on Surface Crosslinking of Plasma-Treated Polymers Investigated by Surface Force Microscopy," *Applied Physics Letters*, Vol. 89, No. 12, 2006, pp. 124102(1–3).
- [141] Neu, C. P., Khalafi, A., Komvopoulos, K., Schmid, T. M., and Reddi, A. H., "Mechanotransduction of Bovine Articular Cartilage Superficial Zone Protein by Transforming Growth Factor  $\beta$  Signaling," *Arthritis and Rheumatism*, Vol. 56, No. 11, 2007, pp. 3706–3714.



- [142] Tajima, S., and Komvopoulos, K., "Dependence of Nanomechanical Modification of Polymers on Plasma-Induced Cross-Linking," *Journal of Applied Physics*, Vol. 101, No. 1, 2007, pp. 014307(1–8).
- [143] Zhang, H.-S., and Komvopoulos, K., "Thermomechanical Effects on Phase Transformations in Single-Crystal Cu-Al-Ni Shape-Memory Alloy," *Journal of Materials Research*, Vol. 22, No. 4, 2007, pp. 994–1003.
- [144] Zhou, J., and Komvopoulos, K., "Surface and Interface Viscoelastic Behaviors of Thin Polymer Films Investigated by Nanoindentation," *Journal of Applied Physics*, Vol. 100, No. 11, 2006, pp. 114329(1–8); *Virtual Journal of Nanoscale Science and Technology*, Vol. 14, No. 26, December 25, 2006.
- [145] Zhou, J., and Komvopoulos, K., "Interfacial Viscoelasticity of Thin Polymer Films Studied by Nanoscale Dynamic Mechanical Analysis," *Applied Physics Letters*, Vol. 90, No. 2, 2007, pp. 021910(1–3); *Virtual Journal of Nanoscale Science and Technology*, Vol. 15, No. 3, January 22, 2007.
- [146] Tajima, S., and Komvopoulos, K., "Physicochemical Properties and Morphology of Fluorocarbon Films Synthesized on Crosslinked Polyethylene by Capacitively Coupled Octafluorocyclobutane Plasma," *Journal of Physical Chemistry C*, Vol. 111, No. 11, 2007, pp. 4358–4367.
- [147] Tajima, S., Chu, J. S. F., Li, S., and Komvopoulos, K., "Differential Regulation of Endothelial Cell Adhesion, Spreading, and Cytoskeleton on Low-Density Polyethylene by Nanotopography and Surface Chemistry Modification Induced by Argon Plasma Treatment," *Journal of Biomedical Materials Research, Part A*, Vol. 84A, No. 3, 2008, pp. 828–836.
- [148] Timpe, S. J., and Komvopoulos, K., "Effects of Electrical and Thermal Phenomena on the Evolution of Adhesion at Contact Interfaces of Electrostatically Activated Surface Microstructures," *Applied Physics Letters*, 90, No. 9, 2007, pp. 093510-1–093510-3.
- [149] Wan, D., and Komvopoulos, K., "Tetrahedral and Trigonal Carbon Atom Hybridization in Thin Amorphous Carbon Films Synthesized by Radio-Frequency Sputtering," *Journal of Physical Chemistry C*, Vol. 111, No. 27, 2007, pp. 9891–9896.
- [150] Timpe, S. J., and Komvopoulos, K., "Microdevice for Measuring Friction and Adhesion Properties of Sidewall Contact Interfaces of Microelectromechanical Systems," *Review of Scientific Instruments*, Vol. 78, No. 6, 2007, pp. 065106(1–9); *Virtual Journal of Nanoscale Science and Technology*, Vol. 16, No. 2, July 9, 2007.
- [151] DuRaine, G., Neu, C. P., Chan, S. M. T., Komvopoulos, K., June, R. K., and Reddi, A. H., "Regulation of the Friction Coefficient of Articular Cartilage by TGF- $\beta$ 1 and IL-1 $\beta$ ," *Journal of Orthopaedic Research*, Vol. 27, No. 2, 2009, pp. 249–256.
- [152] Timpe, S. J., Alsem, D. H., Hook, D. A., Dugger, M. T., and Komvopoulos, K., "Wear of Polysilicon Surface Micromachines Operated in High Vacuum," *Journal of Microelectromechanical Systems*, Vol. 18, No. 2, 2009, pp. 229–238.
- [153] Philippine, M. A., Timpe, S. J., and Komvopoulos, K., "Evolution of Interfacial Adhesion Force in Dynamic Micromachines Due to Repetitive Impact Loading," *Applied Physics Letters*, Vol. 91, No. 6, 2007, pp. 063102(1–3); *Virtual Journal of Nanoscale Science and Technology*, Vol. 16, No. 8, August 20, 2007.
- [154] Bratlie, K. M., Lee, H., Komvopoulos, K., Yang, P., and Somorjai, G. A., "Platinum Nanoparticle Shape Effects on Benzene Hydrogenation Selectivity," *Nano Letters*, Vol. 7, No. 10, 2007, pp. 3097–3101.
- [155] Timpe, S. J., Komvopoulos, K., and Dugger, M. T., "Microscale Friction Phenomena in Oscillatory Sliding Contacts," *Journal of Applied Physics*, Vol. 102, No. 12, 2007, pp. 123503(1–8); *Virtual Journal of Nanoscale Science and Technology*, Vol. 17, No. 1, January 7, 2008.
- [156] Timpe, S. J., Hook, D. A., Dugger, M. T., and Komvopoulos, K., "Levitation Compensation Method for Dynamic Electrostatic Comb-Drive Actuators," *Sensors and Actuators A: Physical*, Vol. 143, No. 2, 2008, pp. 383–389.
- [157] Komvopoulos, K., "Effects of Multi-Scale Roughness and Frictional Heating on Solid Body Contact Deformation," *Comptes Rendus Mécanique*, Vol. 336, No. 1-2, 2008, pp. 149–162.
- [158] Neu, C. P., Komvopoulos, K., and Reddi, A. H., "The Interface of Functional Biotribology and Regenerative Medicine in Synovial Joints," *Tissue Engineering, Part B: Reviews*, Vol. 14, No. 3, 2008, pp. 235–247.

- [159] Komvopoulos, K., Pennecot, G., Yamaguchi, E. S., and Yeh, S. W., “Antiwear Properties of Blends Containing Mixtures of Zinc Dialkyl Dithiophosphate and Different Detergents,” *Tribology Transactions*, Vol. 52, No. 1, 2009, pp. 73-85; *Tribology and Lubrication Technology*, Vol. 65, No. 5, 2009, pp. 36–47.
- [160] Bratlie, K. M., Komvopoulos, K., and Somorjai, G. A., “Sum Frequency Generation Vibrational Spectroscopy of Pyridine Hydrogenation on Platinum Nanoparticles,” *Journal of Physical Chemistry C*, Vol. 112, No. 31, 2008, pp. 11865–11868.
- [161] Zhang, H.-S., and Komvopoulos, K., “Direct-Current Cathodic Vacuum Arc System with Magnetic-Field Mechanism for Plasma Stabilization,” *Review of Scientific Instruments*, Vol. 79, No. 7, 2008, pp. 073905(1–7).
- [162] Zhang, H.-S., and Komvopoulos, K., “Scale-Dependent Nanomechanical Behavior and Anisotropic Friction of Nanotextured Silicon Surfaces,” *Journal of Materials Research*, Vol. 24, No. 10, 2009, pp. 3038–3043.
- [163] Lee, J., Fearing, R. S., and Komvopoulos, K., “Directional Adhesion of Gecko-Inspired Angled Microfiber Arrays,” *Applied Physics Letters*, Vol. 93, No. 19, 2008, pp. 191910(1–3).
- [164] Cheng, Q., and Komvopoulos, K., “Synthesis of Polyethylene Glycol-Like Films from Capacitively Coupled Plasma of Diethylene Glycol Dimethyl Ether Monomer,” *Journal of Physical Chemistry C*, Vol. 113, No. 1, 2009, pp. 213–219.
- [165] Yin, X., and Komvopoulos, K., “Dynamic Finite Element Analysis of Failure in Alternating Phase-Shift Masks Caused by Megasonic Cleaning,” *IEEE Transactions on Components and Packaging Technologies*, Vol. 33, No. 1, 2010, pp. 46–55.
- [166] Thakar, R. G., Cheng, Q., Patel S., Chu, J., Nasir, M., Liepmann, D., Komvopoulos, K., and Li, S., “Cell-Shape Regulation of Smooth Muscle Cell Proliferation,” *Biophysical Journal*, Vol. 96, No. 8, 2009, pp. 3423–3432.
- [167] Zhang, H.-S., and Komvopoulos, K., “Synthesis of Ultrathin Carbon Films by Direct Current Filtered Cathodic Vacuum Arc,” *Journal of Applied Physics*, Vol. 105, No. 8, 2009, pp. 083305(1–7).
- [168] Chan, S. M. T., Neu, C. P., Komvopoulos, K., Reddi, A. H., and Di Cesare, P. E., “Friction and Wear of Hemiarthroplasty Biomaterials in Reciprocating Sliding Contact with Articular Cartilage,” *Journal of Tribology*, ASME Trans., Vol. 133, No. 4, 2011, pp. 041201(1–7).
- [169] Cheng, Q., Li, S., Komvopoulos, K., “Plasma-Assisted Surface Chemical Patterning for Single-Cell Culture,” *Biomaterials*, Vol. 30, No. 25, 2009, pp. 4203–4210.
- [170] Zhang, H.-S., and Komvopoulos, K., “*In Situ* Synchrotron X-ray Microdiffraction Analysis of Thermomechanically Induced Phase Transformations in Cu–Al–Ni Shape-Memory Alloy,” *Philosophical Magazine*, Vol. 90, No. 16, 2010, pp. 2235–2248.
- [171] Zhang, H.-S., and Komvopoulos, K., “Surface Modification of Magnetic Recording Media by Filtered Cathodic Vacuum Arc,” *Journal of Applied Physics*, Vol. 106, No. 9, 2009, pp. 093504(1–7).
- [172] Xu, H., and Komvopoulos, K., “A Quasi-Static Mechanics Analysis of Three-Dimensional Nanoscale Surface Polishing,” *Journal of Manufacturing Science and Engineering*, ASME Trans., Vol. 132, No. 3, 2010, pp. 030912(1–10).
- [173] Neu, C. P., Reddi, A. H., Komvopoulos, K., Schmid, T. M., and Di Cesare, P. E., “Increased Friction Coefficient and Superficial Zone Protein Expression in Patients with Advanced Osteoarthritis,” *Arthritis and Rheumatism*, Vol. 62, No. 9, 2010, pp. 2680–2687.
- [174] Chan, S. M. T., Neu, C. P., DuRaine, G., Komvopoulos, K., and Reddi, A. H., “Atomic Force Microscope Investigation of the Boundary-Lubricant Layer in Articular Cartilage,” *Osteoarthritis and Cartilage*, Vol. 18, No. 7, 2010, pp. 956–963.
- [175] Yin, X., and Komvopoulos, K., “An Adhesive Wear Model of Fractal Surfaces in Normal Contact,” *International Journal of Solids and Structures*, Vol. 47, No. 7-8, 2010, pp. 912–921.
- [176] Cheng, Q., and Komvopoulos, K., “Integration of Plasma-Assisted Surface Chemical Modification, Soft Lithography, and Protein Surface Activation for Single-Cell Patterning,” *Applied Physics Letters*, Vol. 97, No. 4, 2010, pp. 043705(1–3); *Virtual Journal of Biological Physics Research*, Vol. 20, No. 3, August 1, 2010.

- [177] Cheng, Q., Komvopoulos, K., and Li, S., "Surface Chemical Patterning for Long-Term Single-Cell Culture," *Journal of Biomedical Materials Research, Part A*, Vol. 96A, No. 3, 2011, pp. 507–512.
- [178] Song, Z., and Komvopoulos, K., "Adhesion-Induced Instabilities in Elastic and Elastic–Plastic Contacts During Single and Repetitive Normal Loading," *Journal of the Mechanics and Physics of Solids*, Vol. 59, No. 4, 2011, pp. 884–897.
- [179] Kliewer, C. J., Aliaga, C., Bieri, M., Huang, W., Tsung, C.-K., Wood, J. B., Komvopoulos, K., and Somorjai, G. A., "Furan Hydrogenation over Pt(111) and Pt(100) Single-Crystal Surfaces and Pt Nanoparticles from 1-7 nm: A Kinetic and Sum Frequency Generation Vibrational Spectroscopy Study," *Journal of the American Chemical Society*, Vol. 132, No. 37, 2010, pp. 13088–13095.
- [180] Chan, S. M. T., Neu, C. P., Komvopoulos, K., and Reddi, A. H., "The Role of Lubricant Entrapment at Biological Interfaces: Reduction of Friction and Adhesion in Articular Cartilage," *Journal of Biomechanics*, Vol. 44, No. 11, 2011, pp. 2015–2020.
- [181] Chan, S. M. T., Neu, C. P., Komvopoulos, K., and Reddi, A. H., "Dependence of Nanoscale Friction and Adhesion Properties of Articular Cartilage on Contact Load," *Journal of Biomechanics*, Vol. 44, No. 7, 2011, pp. 1340–1345.
- [182] Zhang, H.-S., and Komvopoulos, K., "Nanoscale Pseudoelastic Behavior of Cu–Al–Ni Shape-Memory Alloy Induced by Partial Indentation Unloading," *Nanoscience and Nanotechnology Letters*, Vol. 2, No. 4, 2010, pp. 332–336.
- [183] Aliaga, C., Tsung, C.-K., Alayoglu, S., Komvopoulos, K., Yang, P., and Somorjai, G. A., "Sum Frequency Generation Vibrational Spectroscopy and Kinetic Study of 2-Methylfuran and 2,5-Dimethylfuran Hydrogenation Over 7 nm Platinum Cubic Nanoparticles," *Journal of Physical Chemistry C*, Vol. 115, No. 16, 2011, pp. 8104–8109.
- [184] Wang, N., and Komvopoulos, K., "Thermal Stability of Ultrathin Amorphous Carbon Films for Energy-Assisted Magnetic Recording," *IEEE Transactions on Magnetics*, Vol. 47, No. 9, 2011, pp. 2277–2282.
- [185] Yin, X., and Komvopoulos, K., "A Discrete Dislocation Plasticity Analysis of a Single-Crystal Half-Space Indented by a Rigid Cylinder," *Journal of Applied Mechanics*, ASME Trans., Vol. 78, No. 4, 2011, pp. 041019(1–10).
- [186] Baker, L. R., Hervier, A., Seo, H., Kennedy, G., Komvopoulos, K., Somorjai, G. A., "Highly n-Type Titanium Oxide as an Electronically Active Support for Platinum in the Catalytic Oxidation of Carbon Monoxide," *Journal of Physical Chemistry C*, Vol. 115, No. 32, 2011, pp. 16006–16011.
- [187] Yin, X., and Komvopoulos, K., "A Discrete Dislocation Plasticity Analysis of a Single-Crystal Semi-infinite Medium Indented by a Rigid Surface Exhibiting Multi-Scale Roughness," *Philosophical Magazine*, Vol. 92, No. 24, 2012, pp. 2984–3005.
- [188] Chan, S. M. T., Neu, C. P., DuRaine, G., Komvopoulos, K., and Reddi, A. H., "Tribological Altruism: A Sacrificial Layer Mechanism of Synovial Joint Lubrication," *Journal of Biomechanics*, Vol. 45, No. 14, 2012, pp. 2426–2431.
- [189] Yin, X., and Komvopoulos, K., "A Slip-Line Plasticity Analysis of Abrasive Wear of a Smooth and Soft Surface Sliding Against a Rough (Fractal) and Hard Surface," *International Journal of Solids and Structures*, Vol. 49, No. 1, 2012, pp. 121–131.
- [190] Yin, X., and Komvopoulos, K., "A Slip-Line Plasticity Analysis of Sliding Friction of Rough Surfaces Exhibiting Self-Affine (Fractal) Behavior," *Journal of the Mechanics and Physics of Solids*, Vol. 60, No. 3, 2012, pp. 538–555.
- [191] Cheng, Q., and Komvopoulos, K., "Nanoscale Mechanical and Tribological Properties of Fluorocarbon Films Grafted onto Plasma-Treated Low-Density Polyethylene Surfaces," *Journal of Physics D: Applied Physics*, Vol. 45, No. 9, 2012, pp. 095401(1–9).
- [192] Alsem, D. H., Xiang, H., Ritchie, R. O., and Komvopoulos, K., "Sidewall Adhesion and Sliding Contact Behavior of Polycrystalline Silicon Microdevices Operated in High Vacuum," *Journal of Microelectromechanical Systems*, Vol. 21, No. 2, 2012, pp. 359–369.
- [193] Cheng, Q., Lee, B. L.-P., Komvopoulos, K., and Li, S., "Engineering the Microstructure of Electrospun Fibrous Scaffolds by Microtopography," *Biomacromolecules*, Vol. 14, No. 5, 2013, pp. 1349–1360.
- [194] Hervier, A., Baker, L. R., Komvopoulos, K., and Somorjai, G. A., "Titanium Oxide/Platinum Catalysis: Charge Transfer from a Titanium Oxide Support Controls Activity and Selectivity in Methanol Oxidation on Platinum," *Journal of Physical Chemistry C*, Vol. 115, No. 46, 2011, pp. 22960–22964.

- [195] Xiang, H., and Komvopoulos, K., "Evolution of Sidewall Adhesion in Surface Micromachines Due to Repetitive Impact Loading," *Journal of Applied Physics*, Vol. 111, No. 5, 2012, pp. 054507(1–7).
- [196] Xu, H., and Komvopoulos, K., "Elastic-Plastic Analysis of Adhesive Sliding Contacts," *Journal of Applied Mechanics*, ASME Trans., Vol. 80, No. 4, 2013, pp. 041010(1–11).
- [197] Wang, N., and Komvopoulos, K., "Incidence Angle Effect of Energetic Carbon Ions on Deposition Rate, Topography, and Structure of Ultrathin Amorphous Carbon Films Deposited by Filtered Cathodic Vacuum Arc," *IEEE Transactions on Magnetics*, Vol. 48, No. 7, 2012, pp. 2220–2227.
- [198] Cheng, Q., Lee, B. L.-P., Komvopoulos, K., Yan, Z., and Li, S., "Plasma Surface Chemical Treatment of Electrospun Poly(L-Lactide) Microfibrous Scaffolds for Enhanced Cell Adhesion, Growth, and Infiltration," *Tissue Engineering, Part A*, Vol. 19, No. 9–10, 2013, pp. 1188–1198.
- [199] Krier, J. M., Michalak, W. D., Baker, L. R., An, K., Komvopoulos, K., and Somorjai, G. A., "Sum Frequency Generation Vibrational Spectroscopy of Colloidal Platinum Nanoparticle Catalysts: Disorder versus Removal of Organic Capping," *Journal of Physical Chemistry C*, Vol. 116, No. 33, 2012, pp. 17540–17546.
- [200] Song, Z., and Komvopoulos, K., "Adhesive Contact of an Elastic Semi-infinite Solid with a Rigid Rough Surface: Strength of Adhesion and Contact Instabilities," *International Journal of Solids and Structures*, Vol. 51, No. 6, 2014, pp. 1197–1207.
- [201] Song, Z., and Komvopoulos, K., "Delamination of an Elastic Film from an Elastic-Plastic Substrate During Adhesive Contact Loading and Unloading," *International Journal of Solids and Structures*, Vol. 50, No. 16–17, 2013, pp. 2549–2560.
- [202] Xu, H., and Komvopoulos, K., "Surface Adhesion and Hardening Effects on Elastic-Plastic Deformation, Shakedown and Ratcheting Behavior of Half-Spaces Subjected to Repeated Sliding Contact," *International Journal of Solids and Structures*, Vol. 50, No. 6, 2013, pp. 876–886.
- [203] Song, Z., and Komvopoulos, K., "Adhesive Contact of Elastic-Plastic Layered Media: Effective Tabor Parameter and Mode of Surface Separation," *Journal of Applied Mechanics*, ASME Trans., Vol. 80, No. 2, 2013, pp. 021022(1–9).
- [204] Xiang, H., and Komvopoulos, K., "The Effect of Impact Velocity on Interfacial Adhesion of Contact-Mode Surface Micromachines," *Applied Physics Letters*, Vol. 101, No. 5, 2012, pp. 053506(1–4).
- [205] Kweskin, S. J., Rioux, R. M., Song, H., Komvopoulos, K., Yang, P., and Somorjai, G. A., "High-Pressure Adsorption of Ethylene on Cubic Pt Nanoparticles and Pt(100) Single Crystals Probed by in Situ Sum Frequency Generation Vibrational Spectroscopy," *ACS Catalysis*, Vol. 2, No. 11, 2012, pp. 2377–2386.
- [206] Song, Z., and Komvopoulos, K., "Elastic-Plastic Spherical Indentation: Deformation Regimes, Evolution of Plasticity, and Hardening Effect," *Mechanics of Materials*, Vol. 61, 2013, pp. 91–100. (Corrigendum, *Mechanics of Materials*, Vol. 91, Part 1, 2015, p. 262.)
- [207] Michalak, W. D., Krier, J. M., Komvopoulos, K., and Somorjai, G. A., "Structure Sensitivity in Pt Nanoparticle Catalysts for Hydrogenation of 1,3-Butadiene: *In Situ* Study of Reaction Intermediates Using SFG Vibrational Spectroscopy," *Journal of Physical Chemistry C*, Vol. 117, No. 4, 2013, pp. 1809–1817.
- [208] Wang, N., Komvopoulos, K., Rose, F., and Marchon, B., "Structural Stability of Hydrogenated Amorphous Carbon Overcoats Used in Heat-Assisted Magnetic Recording Investigated by Rapid Thermal Annealing," *Journal of Applied Physics*, Vol. 113, No. 8, 2013, pp. 083517(1–7).
- [209] Xu, H., and Komvopoulos, K., "Fracture Mechanics Analysis of Asperity Cracking Due to Adhesive Normal Contact," *International Journal of Fracture*, Vol. 181, No. 2, 2013, pp. 273–283.
- [210] Cheng, Q., Komvopoulos, K., and Li, S., "Plasma-Assisted Heparin Conjugation on Electrospun Poly(L-Lactide) Fibrous Scaffolds," *Journal of Biomedical Materials Research, Part A*, Vol. 102, No. 5, 2014, pp. 1408–1414.
- [211] Tartibi, M., Steigmann, D. J., and Komvopoulos, K., "A Reverse Updated Lagrangian Finite Element Formulation for Determining Material Properties from Measured Force and Displacement Data," *Computational Mechanics*, Vol. 54, No. 6, 2014, pp. 1375–1394.

- [212] Wang, N., and Komvopoulos, K., “The Multilayered Structure of Ultrathin Amorphous Carbon Films Synthesized by Filtered Cathodic Vacuum Arc Deposition,” *Journal of Materials Research*, Vol. 28, No. 16, 2013, pp. 2124–2131.
- [213] Xiang, H., and Komvopoulos, K., “Effect of Fluorocarbon Self-Assembled Monolayer Films on Sidewall Adhesion and Friction of Surface Micromachines With Impacting and Sliding Contact Interfaces,” *Journal of Applied Physics*, Vol. 113, No. 22, 2013, pp. 224505(1–9).
- [214] Xiang, H., and Komvopoulos, K., “High-Vacuum Adhesion and Friction Properties of Sliding Contact-Mode Micromachines,” *Applied Physics Letters*, Vol. 103, No. 3, 2013, pp. 033507(1–4).
- [215] Jee, T., and Komvopoulos, K., “*In Vitro* Measurement of the Mechanical Properties of Skin by Nano/Microindentation Methods,” *Journal of Biomechanics*, Vol. 47, No. 5, 2014, pp. 1186–1192.
- [216] Michalak, W. D., Krier, J. M., Alayoglu, S., Shin, J.-Y., An, K., Komvopoulos, K., Liu, Z., and Somorjai, G. A., “CO Oxidation on PtSn Nanoparticle Catalysts Occurs at the Interface of Pt and Sn Oxide Domains Formed Under Reaction Conditions,” *Journal of Catalysis*, Vol. 312, 2014, pp. 17–25.
- [217] Shi, F., Baker, L. R., Hervier, A., Somorjai, G. A., and Komvopoulos, K., “Tuning the Electronic Structure of Titanium Oxide Support to Enhance the Electrochemical Activity of Platinum Nanoparticles,” *Nano Letters*, Vol. 13, No. 9, 2013, pp. 4469–4474.
- [218] Jee, T., and Komvopoulos, K., “Skin Viscoelasticity Studied *in Vitro* by Microprobe-Based Techniques,” *Journal of Biomechanics*, Vol. 47, No. 2, 2014, pp. 553–559.
- [219] Jee, T., and Komvopoulos, K., “*In Vitro* Investigation of Skin Damage Due to Microscale Shearing,” *Journal of Biomedical Materials Research, Part A*, Vol. 102, No. 11, 2014, pp. 4078–4086.
- [220] Pathem, B. K., Guo, X.-C., Rose, F., Wang, N., Komvopoulos, K., Schreck, E., and Marchon, B., “Carbon Overcoat Oxidation in Heat-Assisted Magnetic Recording,” *IEEE Transactions on Magnetics*, Vol. 49, No. 7, 2013, pp. 3721–3724.
- [221] Pu, J., and Komvopoulos, K., “Mechanical Properties of Electrospun Bilayer Fibrous Membranes as Potential Scaffolds for Tissue Engineering,” *Acta Biomaterialia*, Vol. 10, No. 6, 2014, pp. 2718–2726.
- [222] Wang, N., and Komvopoulos, K., “The Effect of Deposition Energy of Energetic Atoms on the Growth and Structure of Ultrathin Amorphous Carbon Films Studied by Molecular Dynamics Simulations,” *Journal of Physics D: Applied Physics*, Vol. 47, No. 24, 2014, pp. 245303(1–11).
- [223] Shi, F., Zhao, H., Liu, G., Ross, P. N., Somorjai, G. A., and Komvopoulos, K., “Identification of Diethyl 2,5-Dioxahexane Dicarboxylate and Polyethylene Carbonate as Decomposition Products of Ethylene Carbonate Based Electrolytes by Fourier Transform Infrared Spectroscopy,” *Journal of Physical Chemistry C*, Vol. 118, No. 27, 2014, pp. 14732–14738.
- [224] Song, Z., and Komvopoulos, K., “Contact Mechanics Analysis of Oscillatory Sliding of a Rigid Fractal Surface Against an Elastic–Plastic Half-Space,” *Philosophical Magazine*, Vol. 94, No. 28, 2014, pp. 3215–3233.
- [225] Song, Z., and Komvopoulos, K., “An Elastic–Plastic Analysis of Spherical Indentation: Constitutive Equations for Single-Indentation Unloading and Development of Plasticity Due to Repeated Indentation,” *Mechanics of Materials*, Vol. 76, 2014, pp. 93–101.
- [226] Jee, T., Yoon, S.-H., and Komvopoulos, K., “Surface Damage of Thin-Film Patterned Electrodes Due to Bubble Collapse,” *Nanoscience and Nanotechnology Letters*, Vol. 6, No. 11, 2014, pp. 971–975.
- [227] Xie, J., and Komvopoulos, K., “Hybridization and Tribomechanical Properties of Ultrathin Amorphous Carbon Films Synthesized by Radio-Frequency Low-Pressure Plasma Discharges,” *Surface and Coatings Technology*, Vol. 262, 2015, pp. 15–20.
- [228] Matlak, J., and Komvopoulos, K., “Friction Properties of Amorphous Carbon Ultrathin Films Deposited by Filtered Cathodic Vacuum Arc and Radio-Frequency Sputtering,” *Thin Solid Films*, Vol. 579, 2015, pp. 167–173.
- [229] Pu, J., Yuan, F., Li, S., and Komvopoulos, K., “Electrospun Bilayer Fibrous Scaffolds for Enhanced Cell Infiltration and Vascularization *in Vivo*,” *Acta Biomaterialia*, Vol. 13, 2015, pp. 131–141.

- [230] Krier, J. M., Michalak, W. D., Cai, X., Carl, L., Komvopoulos, K., Somorjai, G. A., “Sum Frequency Generation Vibrational Spectroscopy of 1,3-Butadiene Hydrogenation on 4 nm Pt@SiO<sub>2</sub>, Pd@SiO<sub>2</sub>, and Rh@SiO<sub>2</sub> Core-Shell Catalysts,” *Nano Letters*, Vol. 15, No. 1, 2015, pp. 39–44.
- [231] Ebrahimi, S., Steigmann, D. J., and Komvopoulos, K., “Peridynamics Analysis of the Nanoscale Friction and Wear Properties of Amorphous Carbon Thin Films,” *Journal of Mechanics of Materials and Structures*, Vol. 10, No. 5, 2015, pp. 559–572.
- [232] Tartibi, M., Liu, Y. X., Liu, G.-Y., and Komvopoulos, K., “Single-Cell Mechanics – An Experimental–Computational Method for Quantifying the Membrane–Cytoskeleton Elasticity of Cells,” *Acta Biomaterialia*, Vol. 27, 2015, pp. 224–235.
- [233] Shi, F., Ross, P. N., Zhao, H., Liu, G., Somorjai, G. A., and Komvopoulos, K., “A Catalytic Path for Electrolyte Reduction in Lithium-Ion Cells Revealed by *in Situ* Attenuated Total Reflection-Fourier Transform Infrared Spectroscopy,” *Journal of the American Chemical Society*, Vol. 137, No. 9, 2015, pp. 3181–3184.
- [234] Xie, J., and Komvopoulos, K., “The Role of Duty Cycle of Substrate Pulse Biasing in Filtered Cathodic Vacuum Arc Deposition of Amorphous Carbon Films,” *IEEE Transactions on Magnetics*, Vol. 51, No. 12, 2015, pp. 3302009(1–9).
- [235] Pu, J., Wang, X., Zhang, T., Li, S., Liu, J., and Komvopoulos, K., “High-Energy-Density, All-Solid-State Microsupercapacitors with Three-Dimensional Interdigital Electrodes of Carbon/Polymer Electrolyte Composite,” *Nanotechnology*, Vol. 27, No. 4, 2016, pp. 045701(1–12).
- [236] Tartibi, M., Steigmann, D. J., and Komvopoulos, K., “An Inverse Finite Element Method for Determining Residual and Current Stress Fields in Solids,” *Computational Mechanics*, Vol. 58, No. 5, 2016, pp. 797–817.
- [237] Krier J. M., Komvopoulos, K., and Somorjai, G. A., “Cyclohexane and 1,4-Cyclohexadiene Hydrogenation Occur through Mutually Exclusive Intermediate Pathways on Platinum Nanoparticles,” *Journal of Physical Chemistry C*, Vol. 120, No. 15, 2016, pp. 8246–8250.
- [238] Xie, J., and Komvopoulos, K., “Thermal Stability of Ultrathin Amorphous Carbon Films Synthesized by Plasma-Enhanced Chemical Vapor Deposition and Filtered Cathodic Vacuum Arc,” *Philosophical Magazine*, Vol. 97, No. 11, 2017, pp. 820–832.
- [239] Shi, F., Song, Z., Ross, P. N., Somorjai, G. A., Ritchie, R. O., and Komvopoulos, K., “Failure Mechanisms of Single-Crystal Silicon Electrodes Subjected to Electrochemical Lithiation/Delithiation in Lithium-Ion Batteries,” *Nature Communications*, Vol. 7, 2016, pp. 11886(1–8).
- [240] Xie, J., and Komvopoulos, K., “Friction, Nanostructure, and Residual Stress of Single-Layer and Multi-Layer Amorphous Carbon Films Deposited by Radio-Frequency Sputtering,” *Journal of Materials Research*, Vol. 31, No. 13, 2016, pp. 1857–1864.
- [241] Xie, J., and Komvopoulos, K., “The Effect of Argon Ion Irradiation on the Thickness and Structure of Ultrathin Amorphous Carbon Films,” *Journal of Applied Physics*, Vol. 119, No. 9, 2016, pp. 095304(1–6).
- [242] Xie, J., and Komvopoulos, K., “Bilayer Amorphous Carbon Films Synthesized by Filtered Cathodic Vacuum Arc Deposition,” *Journal of Materials Research*, Vol. 31, No. 20, 2016, pp. 3161–3167.
- [243] Pu, J., Wang, X., Xu, R., and Komvopoulos, K., “Highly Stretchable Microsupercapacitor Arrays with Honeycomb Structures for Integrated Wearable Electronic Systems,” *ACS Nano*, Vol. 10, No. 10, 2016, pp. 9306–9315.
- [244] Qi, J., and Komvopoulos, K., “A Molecular Dynamics Analysis of Ion Irradiation of Ultrathin Amorphous Carbon Films,” *Journal of Applied Physics*, Vol. 120, No. 12, 2016, pp. 125311-1–125311-6.
- [245] Pu, J., Wang, X., Xu, R., Xu, S., and Komvopoulos, K., “Highly Flexible, Foldable, and Rollable Microsupercapacitors on an Ultrathin Polyimide Substrate with High Power Density,” *Microsystems and Nanoengineering*, Vol. 4, 2018, pp. 16(1–11).
- [246] Shi, F., Ross, P. N., Somorjai, G. A., and Komvopoulos, K., “The Chemistry of Electrolyte Reduction on Silicon Electrodes Revealed by *in Situ* ATR-FTIR Spectroscopy,” *Journal of Physical Chemistry C*, Vol. 121, No. 27, 2017, pp. 14476–14483.

- [247] Wang, S., Yin, X., Wang, H., and Komvopoulos, K., “A Generalized Mechanics Theory of Idealized Rough Surfaces Under Dry and Liquid-Mediated Plastic Contact Conditions” *International Journal of Solids and Structures*, Vol. 155, No. 18, 2018, pp. 304–318.
- [248] Matlak, J., and Komvopoulos, K., “Ultrathin Amorphous Carbon Films Synthesized by Filtered Cathodic Vacuum Arc Used as Protective Overcoats of Heat-Assisted Magnetic Recording Heads,” *Scientific Reports*, Vol. 8, 2018, pp. 9647(1–11).
- [249] Lee, A., and Komvopoulos, K., “Dynamic Spherical Indentation of Elastic-Plastic Solids,” *International Journal of Solids and Structures*, Vol. 146, No. 11, 2018, pp. 180–191.
- [250] Matlak, J., Rismaniyazdi, E., and Komvopoulos, K., “Nanostructure, Structural Stability, and Diffusion Characteristics of Layered Coatings for Heat-Assisted Magnetic Recording Head Media,” *Scientific Reports*, Vol. 8, 2018, pp. 9807(1–15).
- [251] Wang, S., and Komvopoulos, K., “Electromagnetic and Thermomechanical Analysis of Near-Field Heat Transfer in Heat-Assisted Magnetic Recording Heads,” *IEEE Transactions on Magnetics*, Vol. 54, No. 8, 2018, pp. 3000906(1–6).
- [252] Vangelatos, Z., Melissinaki, V., Farsari, M., Komvopoulos, K., and Grigoropoulos, C., “Intertwined Microlattices Greatly Enhance the Performance of Mechanical Metamaterials,” *Mathematics and Mechanics of Solids*, Vol. 24, No. 8, 2019, pp. 2636–2648.
- [253] Wang, S., and Komvopoulos, K., “Effect of Material Optical Properties on Thermo-Plasmonics of Heat-Assisted Magnetic Recording Devices,” *Journal of Applied Physics*, Vol. 124, No. 18, 2018, pp. 185109(1–8).
- [254] Xu, R., Zhang, Y., and Komvopoulos, K., “Mechanical Designs Employing Buckling Physics for Reversible and Omnidirectional Stretchability in Microsupercapacitor Arrays,” *Materials Research Letters*, Vol. 7, No. 3, 2019, pp. 110–116.
- [255] Lee, A., and Komvopoulos, K., “Dynamic Spherical Indentation of Strain Hardening Materials With and Without Strain Rate-Dependent Deformation Behavior,” *Mechanics of Materials*, Vol. 133, 2019, pp. 128–137.
- [256] Vangelatos, Z., Komvopoulos, K., and Grigoropoulos, C., “Vacancies for Controlling the Behavior of Microstructured Three-Dimensional Mechanical Metamaterials,” *Mathematics and Mechanics of Solids*, Vol. 24, No. 2, 2019, pp. 511–524.
- [257] Yang, J., and Komvopoulos, K., “A Stress Analysis Method for Molecular Dynamics Systems,” *International Journal of Solids and Structures*, Vols. 193–194, 2020, pp. 98–105.
- [258] Xu, H., and Komvopoulos, K., “A Fracture Mechanics Analysis of Asperity Cracking due to Sliding Contact,” *International Journal of Solids and Structures*, Vol. 171, 2019, pp. 1–9.
- [259] Ma, X.-G., and Komvopoulos, K., “Pseudoelasticity and Shape Memory Effects on the Deformation Recovery of Indented Titanium-Nickel Alloy Films,” *Nanoscience and Nanotechnology Letters*, Vol. 11, No. 9, 2019, pp. 1316–1320.
- [260] Chakravartula, A. M., Pruitt, L. A., and Komvopoulos, K., “Viscoelastic Properties of Plasma-Treated Low-Density Polyethylene Surfaces Determined by Nanoscale Dynamic Mechanical Analysis,” *Materials Research Letters*, Vol. 7, No. 8, 2019, pp. 320–326.
- [261] Komvopoulos, K., “A Multiscale Theoretical Analysis of the Mechanical, Thermal, and Electrical Characteristics of Rough Contact Interfaces Demonstrating Fractal Behavior,” *Frontiers in Mechanical Engineering*, Vol. 6, 2020, pp. 36(1–20).
- [262] Vangelatos, Z., Komvopoulos, K., Spanos, J., Farsari, M., and Grigoropoulos, C., “Anisotropic and Curved Lattice Members Enhance the Structural Integrity and Mechanical Performance of Architected Metamaterials,” *International Journal of Solids and Structures*, Vols. 193–194, 2020, pp. 287–301.
- [263] Xu, H., and Komvopoulos, K., “Fracture and Fatigue of the Surface Layer of Layered Media due to Adhesive Sliding Contact,” *Engineering Fracture Mechanics*, Vol. 223, 2020, pp. 106697(1–12).

- [264] Wu, Y., Wang, S., and Komvopoulos, K., “A Review of Graphene Synthesis by Indirect and Direct Deposition Methods,” *Journal of Materials Research*, Vol. 35, No. 1, 2020, pp. 76–89.
- [265] Wang, S., and Komvopoulos, K., “Structure Evolution During Deposition and Thermal Annealing of Amorphous Carbon Ultrathin Films Investigated by Molecular Dynamics Simulations,” *Scientific Reports*, Vol. 10, 2020, pp. 8089(1–12).
- [266] Ma, X.-G., and Komvopoulos, K., “Nanoindentation-Induced Deformation, Microfracture, and Phase Transformation in Crystalline Materials Investigated In Situ by Acoustic Emission,” *Journal of Materials Research*, Vol. 35, No. 4, 2020, pp. 380–390.
- [267] Vangelatos, Z., Komvopoulos, K., and Grigoropoulos, C. P., “Regulating the Mechanical Behavior of Metamaterial Microlattices by Tactical Structure Modification,” *Journal of the Mechanics and Physics of Solids*, Vol. 144, 2020, pp. 104112(1–17).
- [268] Wang, S., Roy, A., and Komvopoulos, K., “Thermal Stability and Diffusion Characteristics of Ultrathin Amorphous Carbon Films Grown on Crystalline and Nitrogenated Silicon Substrates by Filtered Cathodic Vacuum Arc Deposition,” *Scientific Reports*, Vol. 11, 2021, pp. 13106(1–11).
- [269] Wang, S., and Komvopoulos, K., “Molecular Dynamics Simulations of Internal Stress Evolution in Ultrathin Amorphous Carbon Films Subjected to Thermal Annealing,” *Thin Solid Films*, Vol. 713, 2020, pp. 138247(1–8).
- [270] Wu, Y., Zhang, S., Meng, J., Wang, S., Yu, S., Ma, Y., Tang, B., Liu, Y., and Komvopoulos, K., “Influence of Si on the Microstructure and Mechanical and Tribological Properties of Ag/a-C:H Films,” *Tribology Transactions*, Vol. 63, No. 5, 2020, pp. 897–905.
- [271] Cen, J., and Komvopoulos, K., “On the Mechanics of Metal Imprinting by Nominally Flat and Patterned Rigid Surfaces,” *International Journal of Solids and Structures*, Vol. 206, 2020, pp. 426–435.
- [272] Vangelatos, Z., Li, C., Grigoropoulos, C., and Komvopoulos, K., “Comparison of the Mechanical Performance of Architected Three-Dimensional Intertwined Lattices at the Macro/Microscale,” *Extreme Mechanics Letters*, Vol. 40, 2020, pp. 100930(1–10).
- [273] Wang, S., Wu, Y., and Komvopoulos, K., “Single-Step Metal-Catalyzed Synthesis of Hybrid Planar Graphene–Orbicular Graphitic Carbon Structures Using an Amorphous Carbon Thin Film as a Precursor,” *Applied Surface Science*, Vol. 552, 2021, pp. 149018(1–8).
- [274] Echeverria Molina, M. I., Malollari, K. G., and Komvopoulos, K., “Design Challenges in Polymeric Scaffolds for Tissue Engineering,” *Frontiers in Bioengineering and Biotechnology*, Vol. 9, 2021, pp. 617141(1–29).
- [275] Wang, S., and Komvopoulos, K., “A Molecular Dynamics Study of the Oxidation Mechanism, Nanostructure Evolution, and Friction Characteristics of Ultrathin Amorphous Carbon Films in Vacuum and Oxygen Atmosphere,” *Scientific Reports*, Vol. 11, 2021, pp. 3914(1–15).
- [276] Wang, S., and Komvopoulos, K., “A Molecular Dynamics Analysis of the Effect of Surface Passivation on the Adhesion, Deformation Behavior and Structure Stability of Amorphous Carbon Ultrathin Films,” *Materials Letters*, Vol. 289, 2021, pp. 129435(1–4).
- [277] Echeverria Molina, M. I., and Komvopoulos, K., “An Electrostatic Finite Element Analysis of the Electrospinning Process of Bilayer Constructs using a Parallel-Plate Collector,” *Materials Letters*, Vol. 313, 2022, pp. 131649(1–4).
- [278] Cen, J., and Komvopoulos, K., “Plasticity-Induced Damage and Material Loss in Oscillatory Contacts,” *International Journal of Solids and Structures*, Vol. 254–255, 2022, pp. 111932(1–8).
- [279] Sattari Baboukani, B., Nalam, P. C., and Komvopoulos, K., “Nanoscale Friction Characteristics of Layered-Structure Materials in Dry and Wet Environments,” *Frontiers in Mechanical Engineering*, Vol. 8, 2022, pp. 965877(1–30).
- [280] Roy, A., Wang, S., and Komvopoulos, K., “A Review of Plasma-Assisted Deposition Methods for Amorphous Carbon Thin and Ultrathin Films with a Focus on the Cathodic Vacuum Arc Technique,” *Journal of Materials Research*, Vol. 38, No. 3, 2023, pp. 586–616.



- [281] Echeverria Molina, M. I., Chen, C.-A., Martinez, J., Tran, P., and Komvopoulos, K., “Electrospun Polycaprolactone/Calcium Alginate Scaffolds for Skin Tissue Engineering,” *Materials*, Vol. 16, No. 1, 2023, pp. 136(1–18).
- [282] Xu, T., and Komvopoulos, K., “Diamond Nucleation and Growth from Submicron Clusters of Highly Tetrahedral Amorphous Carbon with Embedded Diamond Nanocrystallites,” *Materials*, 2023 (in press).
- [283] Zhang, H.-S., and Komvopoulos, K., “Deposition of Nanometer-Thick Amorphous Carbon Films by Filtered Cathodic Vacuum Arc Under Oblique Ion Incidence Conditions,” *Scientific Reports*, 2023 (submitted).
- [284] Cen, J., and Komvopoulos, K., “A Cohesive-Zone-Based Contact Mechanics Analysis of Delamination in Homogeneous and Layered Half-Spaces Subjected to Normal and Shear Surface Traction,” *Journal of Applied Mechanics*, ASME Trans., 2023 (in press).
- [285] Wang, S., Wang, J., and Komvopoulos, K., “Mechanical Behavior of Bamboo-Like Structures Under Transversal Compressive Loading,” *Biomimetics*, Vol. 8, No. 1, 2023, pp. 103(1–11).
- [286] Maich, A. A., Gronsky, R., and Komvopoulos, K., “Microstructural Evolution of Fretting Wear Mechanisms in Carbon Steel Castings,” *Scientific Reports*, 2023 (submitted).
- [287] Xu, R., and Komvopoulos, K., “A Poisson–Voronoi-Based Finite Element Stress Analysis of Resonating Polysilicon Micromachines,” *Journal of Applied Mechanics*, ASME Trans., 2023 (submitted).

## A.2. Conference and Symposium Proceedings

- [1] Komvopoulos, K., and Nagarathnam, K., “Processing and Characterization of Laser-Cladded Coating Materials,” *Microstructural Development and Control in Materials Processing*, Eds., Durham, D. R., and Saigal, A., MD–Vol. 14, 1989, pp. 57–73.
- [2] Murthy, A. K., Komvopoulos, K., and Brown, S. D., “Processing and Characterization of Multi-Layered Wear-Resistant Ceramic Coatings,” *Microstructural Development and Control in Materials Processing*, Eds., Durham, D. R., and Saigal, A., MD–Vol.14, 1989, pp. 35–45.
- [3] Komvopoulos, K., and Erpenbeck, S. A., “Finite Element Modeling of Orthogonal Metal Cutting,” *Computer Modeling and Simulation of Manufacturing Processes*, Eds., Singh, B., Im, Y. T., Haque, I., and Altan, C., MD–Vol. 20/PED–Vol. 48, 1990, pp. 1–23.
- [4] Alley, R. L., Cuan, G. J., Howe, R. T., and Komvopoulos, K., “The Effect of Release Etch Processing on the Surface Microstructure Stiction,” *Technical Digest, IEEE Solid-State Sensor and Actuator Workshop*, pp. 202–207, 21-25 June 1992, Hilton Head Island, SC.
- [5] Alley, R. L., Mai, P., Komvopoulos, K., and Howe, R. T., “Surface Roughness Modification of Interfacial Contacts in Polysilicon Microstructures,” *Transducers '93, 7<sup>th</sup> International Conference on Solid-State Sensors and Actuators*, pp. 288–291, 7-10 June 1993, Yokohama, Japan.
- [6] Anders, S., Anders, A., Brown, I. G., Wei, B., Komvopoulos, K., Ager III, J. W., and Yu, K. M., “Effect of Vacuum Arc Deposition Parameters on the Properties of Amorphous Carbon Thin Films,” *International Conference on Metallurgical Coatings and Thin Films*, 25-29 April 1994, San Diego, CA.
- [7] Houston, M. R., Howe, R. T., Komvopoulos, K., and Maboudian, R., “Diamond-Like Carbon Films for Silicon Passivation in Microelectromechanical Devices,” *Mechanical Behavior of Diamond and Other Forms of Carbon*, Eds., M. D. Drory, D. B. Bogy, M. S. Donley, and J. E. Field, *Materials Research Society Symposium Proceedings*, Vol. 383, 1995, pp. 391–402.
- [8] Komvopoulos, K., “Surface Texturing and Chemical Treatment Methods for Reducing High Adhesion Forces at Micromachine Interfaces,” *Materials and Device Characterization in Micromachining*, Eds., Friedrich C. R. and Vladimirsky Y., *Proceedings of SPIE*, Vol. 3512, 1998, pp. 106–122 (invited).
- [9] Komvopoulos, K., “Challenging Issues in Microelectromechanical Systems,” *Micro-Electro-Mechanical Systems (MEMS) Proceedings*, DSC–Vol. 66, 1998, pp. 261–264 (invited).

- [10] Klapperich, C., Komvopoulos, K., and Pruitt, L., "Plasma Surface Modification of Medical-Grade Ultra-High Molecular Weight Polyethylene for Improved Tribological Properties," *Biomedical Materials – Drug Delivery, Implants and Tissue Engineering*, Eds., T. Neenan, M. Marcolongo, and R. F. Valentini, *Materials Research Society Symposium Proceedings*, Vol. 550, 1999, pp. 331–336.
- [11] Komvopoulos, K., "Plasma-Enhanced Modification of Surface Chemistry and Friction Characteristics of Polyethylene Catheters for Cardiovascular Balloon Angioplasty," *Proceedings of 11<sup>th</sup> International Conference on Mechanics in Medicine and Biology*, pp. 133–136, 2-5 April 2000, Maui, HI.
- [12] Klapperich, C., Bellare, A., Komvopoulos, K., and Pruitt, L., "Submicron-Scale Indentation and Characterization of Orthopedic Polymers: The Effect of the Crosslink Density and Morphology on the Hardness and Elastic Properties of Polyethylene," *Proceedings of 11<sup>th</sup> International Conference on Deformation, Yield and Fracture of Polymers*, pp. 438–441, 10-13 April 2000, Churchill College, Cambridge, UK.
- [13] Komvopoulos, K., "Microelectromechanical Structures for Multiaxial Fatigue Testing," *Advances in Fracture Research: Proceedings of 10<sup>th</sup> International Conference on Fracture*, Elsevier, Paper No. ICF100217OR, 3-7 December 2001, Honolulu, HI.
- [14] Sun, X., Horowitz, R., and Komvopoulos, K., "Analysis of a Natural Frequency Tracking System for MEMS Fatigue Testing," *Proceedings of 2001 ASME International Mechanical Engineering Congress and Exposition/MEMS*, Paper No. 23849, 11-16 November 2001, New York, NY.
- [15] Chawan, A. D., Chakravartula, A. M., Zhou, J., Pruitt, L. A., Ries, M., and Komvopoulos, K., "Effects of Counterface Roughness and Conformity on the Tribological Performance of Crosslinked and Non-crosslinked Medical-Grade Ultra-High Molecular Weight Polyethylene," *Biological and Biomimetic Materials-Properties to Function*, Eds., J. McKittrick, J. Aizenberg, C. Orme, and P. Vekilov, *Materials Research Society Symposium Proceedings*, Vol. 724, 2002, pp. 95–100.
- [16] White, C. D., Xu, R., Sun, X., and Komvopoulos, K., "Dynamic MEMS Devices for Multi-Axial Fatigue and Elastic Modulus Measurement," *Reliability, Testing, and Characterization of MEMS/MOEMS II*, Eds., R. Ramesham, and D. M. Tauner, *Proceedings of SPIE*, Vol. 4980, 2003, pp. 63–74.
- [17] White, C., Xu, R., Sun, X., and Komvopoulos, K., "Characterization of Microscale Material Behavior with MEMS Resonators," *Proceedings of Nanotechnology 2003 Conference*, Vol. 1, 2003, pp. 494–497, 23-27 February 2003, San Francisco, CA.
- [18] Chimmalgi, A., Choi, T. Y., Grigoropoulos, C. P., Wan, D., and Komvopoulos, K., "Near-Field Nanomodification of Thin Films Using Femtosecond Laser and Atomic Force Microscope," *Proceedings of Nanotechnology 2003 Conference*, Vol. 3, 2003, pp. 55–58, 23-24 February 2003, San Francisco, CA.
- [19] Kogut, L., and Komvopoulos, K., "Adhesion Analysis for MEMS Based on Electrical Contact Resistance Measurements," *Proceedings of STLE/ASME Joint International Tribology Conference*, Paper No. 2003–TRIB–271, 26-29 October 2003, Ponte Vedra Beach, FL.
- [20] Kogut, L., and Komvopoulos, K., "Determination of Real Material Properties from Nanoindentation Experiments," *Proceedings of STLE/ASME Joint International Tribology Conference*, Paper No. 2003–TRIB–272, 26-29 October 2003, Ponte Vedra Beach, FL.
- [21] Chakravartula, A., Zhou, J., Komvopoulos, K., and Pruitt, L., "Nanomechanical Analysis of Surface Properties and Early Wear Mechanisms in UHMWPE," *Proceedings of the Society for Biomaterials*, p. 601, 29<sup>th</sup> Annual Meeting, 30 April–3 May 2003, Reno, NV.
- [22] Kogut, L., Lumbantobing, A., and Komvopoulos, K., "In Situ Monitoring of Native Oxide Film Behavior at MEMS Contact Interfaces Through Basic Electrical Measurements," *Technical Digest, Solid-State Sensor, Actuator and Microsystems Workshop*, pp. 310–315, 6-10 June 2004, Hilton Head Island, SC.
- [23] Maillhot, B., Rivaton, A., Gardette, J.-L., Moustaghfir, A., Tomasella, E., Jacquet, M., Ma, X.-G., and Komvopoulos, K., "Enhancement of Polycarbonate Lifetime and Surface Properties by Deposition of Ceramic Coatings," *40<sup>th</sup> International Symposium on Macromolecules, World Polymer Congress, Macro 2004*, 4-9 July 2004, Paris, France.

- [24] Kogut, L., and Komvopoulos, K., "The Role of Surface Topography in MEMS Switches and Relays," *Proceedings of STLE/ASME Joint International Tribology Conference*, Paper No. TRIB2004-64359, 24-27 October 2004, Long Beach, CA.
- [25] Chakravartula, A., Pruitt, L., Komvopoulos, K., and Bellare, A., "Nanoscale Viscoelastic Properties of Microstructurally-modified UHMWPE," *Proceedings of the Society for Biomaterials*, p. 34, 30<sup>th</sup> Annual Meeting and Exposition, 27-30 April 2005, Memphis, TN.
- [26] Kogut, L., and Komvopoulos, K., "Significance of Surface Topography on Performance and Lifetime of MEMS Switches and Relays," *Materials Research Society Symposium Proceedings*, Vol. 872, 2005, pp. 29-34.
- [27] Zhou, J., and Komvopoulos, K., "Nanoconfinement Effect on the Mechanical Behavior of Polymer Thin Films," *Materials Research Society Symposium Proceedings*, Vol. 880E, Paper BB4.3, 2005, pp. 79-84.
- [28] Komvopoulos, K., "Surface Adhesion and Friction in Microelectromechanical Systems – Measurement and Modification Techniques," *Proceedings of World Tribology Congress III*, Paper No. WTC2005-64107, pp. 831-832, 12-16 September 2005, Washington, D.C.
- [29] Komvopoulos, K., "Scale Effects on Contact Deformation of Elastic-Plastic Solids," *Proceedings of World Tribology Congress III*, Paper No. WTC2005-64246, pp. 419-420, 12-16 September 2005, Washington, D.C.
- [30] Komvopoulos, K., "Plasma-Enhanced Surface Modification of Biopolymers," *Proceedings of World Tribology Congress III*, Paper No. WTC2005-64235, pp. 701-702, 12-16 September 2005, Washington, D.C.
- [31] Neu, C. P., Khalafi, A., Komvopoulos, K., Schmid, T., and Reddi, A. H., "Spatial Distribution of Articular Cartilage Superficial Zone Protein is Functionally Correlated with Friction Coefficient," *52<sup>nd</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 31, Paper No. 1498, 19-22 March 2006, Chicago, IL.
- [32] Timpe, S., and Komvopoulos, K., "Electrical Effect on the Adhesion Force at MEMS Contact Interfaces," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2006-12291, 23-25 October 2006, San Antonio, TX.
- [33] Kweskin, S., Habas, S. E., Rioux, R. M., Komvopoulos, K., Yang, P., and Somorjai, G. A., "Platinum Nanoparticle Cubes in a Catalytic Flow Reactor Investigated by SFG Vibrational Spectroscopy," *Abstracts of the American Chemical Society National Meeting*, Vol. 231, 2006, p. 367.
- [34] Bratlie, K. M., Kweskin, S., Habas, S. E., Komvopoulos, K., and Somorjai, G. A., "In Situ Sum Frequency Generation Vibrational Spectroscopy of CO Oxidation and Ethylene Hydrogenation on Shape Controlled Platinum Nanoparticles," *Abstracts of the American Chemical Society National Meeting*, Vol. 232, 2006, p. 445.
- [35] DuRaine, G. D., Komvopoulos, K., Reddi, A. H., and Neu, C. P., "Spatial Effect of IL-1 $\beta$  on SZP Expression and Friction Coefficient," *53<sup>rd</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 32, Poster No. 0549, 11-14 February 2007, San Diego, CA.
- [36] Neu, C. P., Komvopoulos, K., and Reddi, A. H., "Anatomical Differences in SZP Expression Following Shear Loading," *53<sup>rd</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 32, Poster No. 0616, 11-14 February 2007, San Diego, CA.
- [37] Komvopoulos, K., "Regulation of Cell Adhesion and Proliferation by Physicochemical Surface Modification and Protein Enhancement due to Mechanotransduction," *Proceedings ASME/STLE International Joint Tribology Conference*, Part B, Paper No. IJTC2007-44423, 2008, pp. 973-975, 22-24 October 2007, San Diego, CA.
- [38] Komvopoulos, K., "Scale-Dependent Contact Deformation of Layered Media Due to Multi-Wavelength Surface Roughness Effects," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2007-44420, 2008, pp. 1077-1079, 22-24 October 2007, San Diego, CA.
- [39] Komvopoulos, K., "Surface Modification and Mechanical Stimulation Effects on Cell Proliferation and Protein Expression on Functionalized Biopolymer Surfaces and Articular Cartilage," *2<sup>nd</sup> International Conference on Mechanics of Biomaterials and Tissues*, Paper No. MB43, 9-13 December 2007, Lihue, Kauai, HI.

- [40] Komvopoulos, K., "Effect of Multi-Scale Contact Deformation on Interfacial Forces," Paper No. 3293, *8<sup>th</sup> World Congress on Computational Mechanics & 5<sup>th</sup> European Congress on Computational Methods in Applied Sciences and Engineering*, 30 June–4 July 2008, Venice, Italy.
- [41] Pennecot, G., Komvopoulos, K., and Yamaguchi, E. S., "Synergistic Antiwear Effects of Zinc Dialkyl Dithiophosphate and Different Detergents," *Proceedings ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2008–71013, pp. 185–187, 20–22 October 2008, Miami, FL.
- [42] Yin, X., and Komvopoulos, K., "An Adhesive Wear Model of Fractal Surfaces in Normal Contact," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2008–71063, pp. 529–531, 20–22 October 2008, Miami, FL.
- [43] Zhang, H.-S., and Komvopoulos, K., "Anisotropic Frictional Behavior of Nanotextured Surfaces," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2008–71146, pp. 749–751, 20–22 October 2008, Miami, FL.
- [44] Cheng, Q., and Komvopoulos, K., "Nanomechanical Properties of Fluorocarbon Films Grafted onto Plasma-Treated Low-Density Polyethylene Surfaces," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2008–71224, pp. 139–141, 20–22 October 2008, Miami, FL.
- [45] Xu, H., and Komvopoulos, K., "A Probabilistic Analysis of Third-Body Particle Embedment — Implications in Lapping of Magnetic Recording Heads," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2008–71242, pp. 169–171, 20–22 October 2008, Miami, FL.
- [46] Yin, X., and Komvopoulos, K., "Finite Element Analysis of Alternating Phase-Shift Masks Subjected to Dynamic Pressure Loading Due to Megasonic Cleaning," *Proceedings of 10<sup>th</sup> Electronics Packaging Technology Conference*, pp. 435–443, 9–12 December 2008, Singapore.
- [47] Rivaton, A., Gardette, J.-L., Morlat-Therias, S., Mailhot, B., Tomasella, E., Awitor, O., Komvopoulos, K., and Fabbri, P., "Enhancement of Photoprotection and Mechanical Properties of Polymers by Deposition of Thin Coatings," in *Service Life Prediction of Polymeric Materials: Global Perspectives*, Martin, J. W., Ryntz, R. A., Chin, J., and Dickie, R. A. (Eds.), Elsevier, 2009, pp. 327–343.
- [48] Chan, S., Neu, C., DuRaine, G., Komvopoulos, K., and Reddi, A. H., "Articular Cartilage Friction Following Enzymatic Digestion Measured by Atomic Force Microscopy," *54<sup>th</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 33, Poster No. 641, 2–5 March 2008, San Francisco, CA.
- [49] Chan, S. M. T., Neu, C. P., Komvopoulos, K., Reddi, A. H., and Di Cesare, P., "Friction and Wear of Biomaterials Against Articular Cartilage," *55<sup>th</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 34, Poster No. 2257, 22–25 February 2009, Las Vegas, NV.
- [50] Komvopoulos, K., "Cell Growth Control by Plasma-Assisted Surface Chemical Modification and Role of Mechanotransduction in Protein Secretion in Articular Cartilage," *Abstracts of Papers of the 237<sup>th</sup> ACS National Meeting and Exposition*, p. 412, 22–26 March 2009, Salt Lake City, UT (invited).
- [51] Komvopoulos, K., "Electromechanical and Adhesion Issues in Contact-Mode MEMS Devices," *Proceedings of Symposium on Design, Test, Integration & Packaging of MEMS/MOEMS*, Paper No. 1039, pp. 304–306, 1–3 April 2009, Rome, Italy.
- [52] Cheng, Q., and Komvopoulos, K., "Surface Chemical Patterning for Controlled Cell Adhesion," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2009–15134, pp. 47–49, 19–21 October 2009, Memphis, TN.
- [53] Yin, X., and Komvopoulos, K., "An Abrasive Wear Model of Fractal Surfaces Based on the Slip-Line Theory of Plasticity," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2009–15121, pp. 321–323, 19–21 October 2009, Memphis, TN.
- [54] Song, Z., and Komvopoulos, K., "Spherical Indentation of an Elastic-Perfectly Plastic Half-Space: Deformation Map and Evolution of Plasticity," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2009–15122, pp. 325–327, 19–21 October 2009, Memphis, TN.

- [55] Xu, H., and Komvopoulos, K., "A Three-Dimensional Stochastic Analysis of the Lapping Process Used for Magnetic Recording Heads," *Proceedings of ASME/STLE International Joint Tribology Conference*, Paper No. IJTC2009-15176, pp. 427-429, 19-21 October 2009, Memphis, TN.
- [56] Komvopoulos, K., "Contribution of Passenger Vehicles to Air Pollution in the United States and the Search for Benign Engine Oil Additives," *Proceedings of STLE Annual Meeting*, pp. 599-601, 17-21 May 2009, Orlando, FL.
- [57] Neu, C. P., Reddi, A. H., Komvopoulos, K., and Di Cesare, P., "SZP Immunolocalization in Human Articular Cartilage with Late-Stage Osteoarthritis," *56<sup>th</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 35, Poster No. 0851, 6-9 March 2010, New Orleans, LA.
- [58] Song, Z., and Komvopoulos, K., "A Continuum Mechanics Model of Adhesive Contact Based on the Lennard-Jones Potential," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41154, pp. 411-413, 17-20 October 2010, San Francisco, CA.
- [59] Yin, X., and Komvopoulos, K., "A Discrete Dislocation Plasticity Analysis of Plane-Strain Indentation of a Single-Crystal Half-Space by a Smooth and a Rough Rigid Asperity," *Proceedings STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41155, pp. 415-417, 17-20 October 2010, San Francisco, CA.
- [60] Lee, A., and Komvopoulos, K., "Dynamic Finite Element Analysis of an Elastic-Plastic Half-Space Indented by a Rigid Sphere," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41156, pp. 325-327, 17-20 October 2010, San Francisco, CA.
- [61] Xu, H., and Komvopoulos, K., "Fracture Mechanics Analysis of Asperity Cracking Due to Repetitive Sliding Contact," *Proceedings STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41162, pp. 329-331, 17-20 October 2010, San Francisco, CA.
- [62] Xiang, H., and Komvopoulos, K., "Nanotribological Properties of Polycrystalline Silicon Microdevices Sliding in High Vacuum," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41220, pp. 29-31, 17-20 October 2010, San Francisco, CA.
- [63] Wang, N., and Komvopoulos, K., "Nanomechanical and Friction Properties of Ultrathin Amorphous Carbon Films Studied by Molecular Dynamics Analysis," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41222, pp. 393-395, 17-20 October 2010, San Francisco, CA.
- [64] Jee, T., and Komvopoulos, K., "Damage of Micropatterned Surfaces Due to Bubble Cavitation-Erosion," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41229, pp. 33-35, 17-20 October 2010, San Francisco, CA.
- [65] Tartibi, M., and Komvopoulos, K., "Characterization of the Mechanical Behavior of Cell Components with an Atomic Force Microscope," *Proceedings of STLE/ASME International Joint Tribology Conference*, Paper No. IJTC2010-41230, pp. 53-55, 17-20 October 2010, San Francisco, CA.
- [66] Chan, S. M. T., Neu, C. P., Komvopoulos, K., and Reddi, A. H., "Low Friction and Adhesion in Load-Bearing Articular Cartilage," *57<sup>th</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 36, Poster No. 2146, 13-16 January 2011, Long Beach, CA.
- [67] Chan, S. M. T., Neu, C. P., Komvopoulos, K., and Reddi, A. H., "Wear and Replenishment of the Articular Cartilage Boundary Lubricant Film," *57<sup>th</sup> Annual Meeting, Transactions of Orthopaedic Research Society*, Vol. 36, Paper No. 0035, 13-16 January 2011, Long Beach, CA.
- [68] Gu, P., Wang, Z., and Komvopoulos, K., "Effect of Slanted Angle on Directional Adhesion of Fiber Arrays with Mushroom-Like Flat Tips," *Proceedings of the 36<sup>th</sup> Annual Meeting of the Adhesion Society*, 3-6 March 2013, Daytona Beach, FL.
- [69] Pu, J., Wang, X., Liu, J., Li, S., and Komvopoulos, K., "A 3D All-Solid-State Microsupercapacitor with Electrodes Consisting of Activated Carbon/Polymer Electrolyte Composite," *Transducers 2015, 18<sup>th</sup> International Conference on Solid-State Sensors, Actuators and Microsystems*, pp. 502-505, 21-25 June 2015, Anchorage, AK.
- [70] Pu, J., Wang, X., Kuang, X., Xu, S., Li, S., and Komvopoulos, K., "Stretchable Microsupercapacitor Arrays with a Composite Honeycomb Structure," *29<sup>th</sup> IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2016)*, pp. 1232-1235, 24-28 January 2016, Shanghai, China.

- [71] Vangelatos, Z., Grigoropoulos, C. P., Farsari, M., Gu, G., Ma, Z., and Komvopoulos, K., “Biomechanical Metamaterials Fabricated Through Multiphoton Lithography by Tailoring 3D Buckling,” *Proceedings of SPIE, Laser-based Micro- and Nanoprocessing XIV*, Vol. 11268, Paper No. 1126812, SPIE Photonics West, 1-6 February 2020, San Francisco, CA (*invited*).

## B. Non-Referred Publications in Conference and Symposium Proceedings and Technical Reports

### B.1. Conference and Symposium Proceedings

- [1] Komvopoulos, K., “Mechanisms of Nano-scale Tribology and Instrumentation for MEMS Devices,” Proceedings NSF/AFOSR/ASME Workshop on *Tribology Issues and Opportunities in MEMS*, Columbus, OH, 9-11 November 1997, pp. 619–625.
- [2] Komvopoulos, K., “Nanoengineering and Tribophysics for Microelectromechanical Systems,” *Nanotribology: Critical Assessment and Research Needs*, Eds. S. M. Hsu and Z. C. Ying, Kluwer, Boston, MA, 2002, pp. 139–164. [The archival journal version of this paper is listed as [83]].
- [3] Komvopoulos, K., “Electromechanical Devices for Microscale Fatigue Testing,” *Long Term Durability of Structural Materials: Durability 2000*, Eds., Monteiro, P. J. M., Chong, K. P., Larsen-Basse, J., and Komvopoulos, K., Elsevier, Oxford, UK, 2001, pp. 221–230.
- [4] Komvopoulos, K., “Nanoscale Surface Engineering: Adhesion Forces and Surface Treatments for Friction and Wear Control at Nanometer Scales,” *Proceedings NSF-EC Nanomanufacturing and Processing Workshop*, 5-7 January 2002, San Juan, Puerto Rico.
- [5] Komvopoulos, K., “Effects of Physicochemical Surface Modification and Mechanotransduction on Cell Adhesion, Spreading, and Cytoskeleton Behavior,” *4<sup>th</sup> International Workshop on Nanosciences and Nanotechnologies*, 16-18 July 2007, Thessaloniki, Greece (*invited*).
- [6] Neu, C. P., Khalafi, A., Komvopoulos, K., Schmid, T. M., and Reddi, A. H., “Regional Expression of Articular Cartilage Surface Lubricants Following Mechanical Loading: Implications for Tissue Engineering,” *Tissue Engineering: Part A*, Vol. 14, No. 5, 2008, p. 773.
- [7] Komvopoulos, K., “Surface Chemical Modification Effects on Adhesion and Mechanical Response of Endothelial Cells,” *5<sup>th</sup> International Conference on Nanosciences and Nanotechnologies*, 14-16 July 2008, Thessaloniki, Greece (*invited*).
- [8] Komvopoulos, K., “Surface Micropatterning Technology for Single-Cell Culture,” *6<sup>th</sup> International Conference on Nanosciences and Nanotechnologies*, 13-15 July 2009, Thessaloniki, Greece (*invited*).
- [9] Komvopoulos, K., “Cell Mechanics,” *7<sup>th</sup> International Conference on Nanosciences and Nanotechnologies*, 11-14 July 2010, Ouranoupolis, Halkidiki, Greece (*invited*).
- [10] Rose, F., Wang, N., Komvopoulos, K., and Marchon, B., “Thermal Stability of Diamond-Like Carbon Overcoats Used in Heat Assisted Magnetic Recording in HDDs,” *23<sup>rd</sup> ASME Annual Conference on Information Storage and Process Systems (ISPS'13)*, Paper No. 2819, 24-25 June 2013, Santa Clara, CA.
- [11] Shi, F., Komvopoulos, K., Ross, P. N., and Somorjai, G. A., “Li-Ion Battery Solid Electrolyte Interface (SEI) Investigation with In-situ Attenuated Total Reflection-Infrared (ATR-IR) Spectroscopy,” *22<sup>4</sup>th Electrochemical Society Meeting*, Paper No. 920, 27 October-1 November 2013, San Francisco, CA.
- [12] Michalak, W. D., Krier, J., Alayoglu, S., Shin, J.-Y., An, K., Komvopoulos, K., Liu, Z., and Somorjai, G. A., “Bifunctional Sn-Oxide and Pt Active Sites for CO Oxidation on PtSn Catalysts,” *American Institute of Chemical Engineers Annual Meeting*, 3-8 November 2013, San Francisco, CA.
- [13] Michalak, W. D., Krier, J., Komvopoulos, K., and Somorjai, G. A., “Structure Sensitivity in Pt Nanoparticle Catalysts for Hydrogenation of 1,3-Butadiene: In Situ Study of Reaction Intermediates Using SFG Vibrational Spectroscopy,” *American Institute of Chemical Engineers Annual Meeting*, 3-8 November 2013, San Francisco, CA.

- [14] Ebrahimi, S., Steigmann, D., and Komvopoulos, K., "A Peridynamics Analysis of the Wear Process of Thin-Film Media," Abstract No. S-19-1036, *17<sup>th</sup> U.S. National Congress on Theoretical and Applied Mechanics*, 15-20 June 2014, East Lansing, MI.
- [15] Shi, F., Komvopoulos, K., Ross, P. N., and Somorjai, G. A., "In-Situ ATR-FTIR Investigation of the Solid Electrolyte Interface (SEI) on Single-Crystal Si Anodes for Li Ion Batteries," *Preprints of Papers-American Chemical Society, Division of Energy Fuels*, Vol. 59, No. 2, 2014, p. 486; presented at the *248<sup>th</sup> American Chemical Society National Meeting and Exposition*, Paper No. 82, 10-14 August 2014, San Francisco, CA,
- [16] Shi, F., Ross, P. N., Somorjai, G., and Komvopoulos, K., "A Combined Experimental-Modeling Study of the Failure Mechanism of Single-Crystal Si Electrodes in Li-Ion Batteries," *2015 MRS Spring Meeting*, 6-10 April 2015, San Francisco, CA.
- [17] Shi, F., Zhao, H., Komvopoulos, K., Somorjai, G., and Ross, P. N., "Tailoring the Desired Surface Chemistry in Silicon-Based Lithium-Ion Batteries with Electrolyte Additives," *227<sup>th</sup> Electrochemical Society Meeting*, Abstract No. 49912, 24-28 May 2015, Chicago, IL.
- [18] Ebrahimi, S., Steigmann, D., and Komvopoulos, K., "Peridynamics Analysis of Wrinkling and Buckle-Delamination of Compressed Elastic Thin Films on Compliant Substrates," *13<sup>th</sup> US National Congress on Computational Mechanics*, 26-30 July 2015, San Diego, CA.
- [19] Shi, F., Zhao, H., Komvopoulos, K., Somorjai, G., and Ross, P. N., "Tailoring the Desired Solid Electrolyte Interphase in Silicon-Based Lithium-Ion Batteries with Electrolyte Additives," *MRS Spring Meeting and Exhibition*, Paper No. EE6.9.05, 28 March-1 April 2016, Phoenix, AZ.

## **B.2. Editorial Notes**

- [1] Yamaguchi, E., and Komvopoulos, K., "Industry Mourns Passing of Tribologist Ray Ryason," *Tribology and Lubrication Technology*, Vol. 62, No. 2, 2006, p. 22.

## **B.3. Technical Reports**

- [1] Suh, N. P., Saka, N., and Komvopoulos, K., "Fundamental Mechanisms of Tribology and Their Implications," Final Report, Contract No. N00014-82-K-0520, Office of Naval Research, 1989.
- [2] Trott, C. R., Rutkowski, D. E., Murthy, A. K., Komvopoulos, K., Buchanan, R. C., and Brown, S. D., "Development of Wear-resistant Ceramic Coatings for Diesel Engine Components," Final Report, Contract No. 86X-SA582C, Caterpillar Tractor, Inc., 1989.
- [3] Nagarathnam, K., and Komvopoulos, K., "Laser Materials Processing by Cladding Techniques for the Development of Friction, Wear, and Corrosion Resistant Applications," Review Report, Fracture Control Program, University of Illinois at Urbana-Champaign, 1990.
- [4] Komvopoulos, K., "Fundamental Tribomechanisms at Severe Contact Conditions," Final Report, Grant No. MSM-8708065, National Science Foundation, 1990.
- [5] Komvopoulos, K., "Faculty Development Award," Progress Report, International Business Machines Corporation, 1991.
- [6] Chu, M.-Y., Komvopoulos, K., and Bogy, D. B., "Surface Imaging by Atomic Force and Scanning Tunneling Microscopy of Thin-Film Rigid Disks," CML Technical Report No. 91-007, 1991.
- [7] Wang, S., and Komvopoulos, K., "Characterization and Modeling of Surface Texture in Rolling," Technical Report to Center for Technology, Kaiser Aluminum and Chemical Corporation, 1992.
- [8] Wang, S., and Komvopoulos, K., "A Fractal Theory of the Interfacial Temperature Distribution in the Slow Sliding Regime: Part I - Elastic Contact and Heat Transfer Analysis," CML Technical Report No. 93-011, 1993.
- [9] Wang, S., and Komvopoulos, K., "A Fractal Theory of the Interfacial Temperature Distribution in the Slow Sliding Regime: Part II - Multiple Domains, Elastoplastic Contacts and Applications," CML Technical Report No. 93-012, 1993.

- [10] Komvopoulos, K., "Basic Research on Microtribology for Micromechanical Devices," Annual Report, Grant No. DL-H-467151, C.S. Draper Laboratory, 1994.
- [11] Komvopoulos, K., Kral, E.R., and Wang, S., "Surface Characterization and Contact Simulation for Magnetic Head-Disk Interfaces," Final Report, DARPA/NSIC, 1995.
- [12] Kral, E. R., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Subsurface Stresses and Shakedown Due to Repeated Sliding on a Layered Medium," CML Technical Report No. 95-013, 1995.
- [13] Wang, S., and Komvopoulos, K., "Friction Force, Contact Resistance, and Lubricant Shear Behavior at the Magnetic Head-Disk Interface During Starting," CML Technical Report No. 95-014, 1995.
- [14] Kral, E. R., and Komvopoulos, K., "Three-Dimensional Finite Element Analysis of Subsurface Stress and Strain Fields Due to Sliding Contact on an Elastic-Plastic Layered Medium," CML Technical Report No. 95-022, 1995.
- [15] Wang, S., and Komvopoulos, K., "Effect of Liquid to Solid-Like Transition of Thin Lubricant Films on Friction at Magnetic Head-Disk Interfaces," CML Technical Report No. 96-010, 1996.
- [16] Yan, W., and Komvopoulos, K., "Contact Mechanics Analysis of Elastic-Plastic Rough Surfaces Characterized by Fractal Geometry," CML Technical Report No. 97-007, 1997.
- [17] Komvopoulos, K., "Processing, Characterization and Tribological Properties of Novel Thin Films," Final Report, Grant No. CMS-8996309 (PVI Award), National Science Foundation, 1998.
- [18] Komvopoulos, K., "Fundamental Investigations of Micro-scale Friction and Wear Mechanisms in Micro-electromechanical Systems," Final Report, Grant No. CMS-9504403, National Science Foundation, 1999.
- [19] Komvopoulos, K., "Fatigue of Polysilicon MEMS Devices," Annual Report, Grant No. DABT63-98-1-001, DARPA/MTO MEMS, 1999.
- [20] Lu, W., and Komvopoulos, K., "Microstructure and Nanomechanical Properties of Nitrogenated Amorphous Carbon Thin Films Synthesized by reactive RF Sputtering," CML Technical Report No. 98-013, 1998.
- [21] Lu, W., and Komvopoulos, K., "Dependence of Plasma Parameters in Low-pressure RF Discharges on Total Mass Flow Rate and Composition of Sputtering Gas," CML Technical Report No. 98-014, 1998.
- [22] Lu, W., and Komvopoulos, K., "Effect of Radio Frequency Sputtering Conditions on the Growth and Nanomechanical Properties of Ultrathin Amorphous Carbon Films," CML Technical Report No. 99-004, 1999.
- [23] Lu, W., and Komvopoulos, K., "Nanomechanical and Nanotribological Properties of Carbon, Chromium, and Titanium Carbide Ultrathin Films," CML Technical Report No. 00-006, 2000.
- [24] Komvopoulos, K., and Ye, N., "Three-Dimensional Contact Analysis of Elastic-Plastic Layered Media with Fractal Surface Topographies," CML Technical Report No. 00-007, 2000.
- [25] Lu, W., Komvopoulos, K., and Yeh, W., "Stability of Ultrathin Amorphous Carbon Films Deposited on Smooth Silicon Substrates by Radio Frequency Sputtering," CML Technical Report No. 00-008, 2000.
- [26] Lu, W., and Komvopoulos, K., "Nanotribological and Nanomechanical Properties of Ultrathin Amorphous Carbon Films Synthesized by Radio Frequency Sputtering," CML Technical Report No. 00-017, 2000.
- [27] Gong, Z.-Q., and Komvopoulos, K., "Effect of Surface Microgeometry on Deformation and Stresses in Elastic-Plastic Layered Media," CML Technical Report No. 01-014, 2001.
- [28] Lu, W., and Komvopoulos, K., "X-ray Photoelectron and Auger Electron Spectroscopy Analysis of Radio-Frequency Sputtered Ultrathin Films of Amorphous Carbon," CML Technical Report No. 01-015, 2001.
- [29] Ye, N., and Komvopoulos, K., "Three-Dimensional Thermomechanical Finite Element Analysis of Elastoplastic Media," CML Technical Report No. 01-017, 2001.
- [30] Ye, N., and Komvopoulos, K., "Hardness Analysis for Elastic-Plastic Layered Media," CML Technical Report No. 02-003, 2002.
- [31] Ye, N., and Komvopoulos, K., "Effect of Residual Stress in Surface Layer on Deformation of Elastic-Plastic Layered Media Under Normal and Sliding Contact Traction," CML Technical Report No. 02-004, 2002.



- [32] Komvopoulos, K., "Fatigue of Polysilicon MEMS Devices," Final Report, Grant No. DABT63-98-1-001, DARPA/MTO MEMS, 2002.
- [33] Ma, X. G., Wan, D. J. Wan, Komvopoulos, K., Bogy, D. B., and, Kim, Y.-S., "Effects of Film Thickness and Contact Load on Nanotribological Properties of Sputtered Amorphous Carbon Thin Films," CML Technical Report No. 02-012, 2002.
- [34] Gong, Z.-Q., and Komvopoulos, K., "Mechanical and Thermomechanical Elastic-Plastic Contact Analysis of Layered Media with Patterned Surfaces," CML Technical Report No. 02-013, 2002.
- [35] Kogut, L., and Komvopoulos, K., "A Generalized Contact Mechanics Analysis of Elastic-Plastic Spherical Indentation," CML Technical Report No. 02-015, 2002.
- [36] Lu, W., and Komvopoulos, K., "Effect of Stress-induced Phase Transformation on Nanomechanical Properties of Sputtered Amorphous Carbon Films, CML Technical Report No. 02-016, 2002.
- [37] Yang, J., and Komvopoulos, K., "Dynamic Indentation of an Elastic-Plastic Multi-Layered Medium by a Rigid Cylinder," CML Technical Report No. 03-003, 2003.
- [38] Gong, Z.-Q., and Komvopoulos, K., "Surface Cracking in Elastic-Plastic Multi-Layered Media Due to Repeated Sliding Contact," CML Technical Report No. 03-014, 2003.
- [39] Wan, D., and Komvopoulos, K., "Statistical Analysis of the Enhancement of Tetrahedral Carbon Hybridization in Amorphous Carbon Films Produced from Low-Pressure Radio-Frequency Plasma Discharges," CML Technical Report No. 03-015, 2003.
- [40] Wan, D., and Komvopoulos, K., "Thermodynamic Analysis of Tetrahedral Carbon Hybridization in Sputtered Amorphous Carbon Films Deposited Without Energetic Ion Bombardment," CML Technical Report No. 03-016, 2003.
- [41] Gong, Z.-Q., and Komvopoulos, K., "Thermomechanical Contact Analysis of Semi-infinite Solids With Fractal Surface Topographies," CML Technical Report No. 03-017, 2003.
- [42] Komvopoulos, K., "Nanofriction Studies: Scale Effects and Measurement Techniques," Final Report, National Institute of Standards and Technology, 2004.
- [43] Wan, D., and Komvopoulos, K., "Effects of Sputtering Conditions on Low-Pressure Radio-Frequency Discharge," CML Technical Report No. 04-014, 2004.
- [44] Wan, D., and Komvopoulos, K., "Effect of Process Conditions on the Growth of Radio-Frequency Sputtered Amorphous Carbon Films," CML Technical Report No. 04-015, 2004.
- [45] Wan, D., and Komvopoulos, K., "Compressive residual stresses in thin sputtered amorphous carbon films," CML Technical Report No. 04-016, 2004.
- [46] Kogut, L., and Komvopoulos, K., "Electrical Contact Resistance Theory for Conductive Rough Surfaces Separated by a Thin Insulating Film," CML Technical Report No. 04-018, 2004.
- [47] Wan, D., and Komvopoulos, K., "XPS Analysis of Sputtered Thin Amorphous Carbon Films," CML Technical Report No. 04-019, 2004.
- [48] Zhang, H.-S., and Komvopoulos, K., "Synthesis of Ultrathin Amorphous Carbon Films by Plasma-Stabilized Direct-Current Filtered Cathodic Vacuum Arc Discharge," CML Technical Report No. 08-001, 2008.
- [49] Zhang, H.-S., and Komvopoulos, K., "Synthesis of Ultrathin Carbon Films by Direct Current Filtered Cathodic Vacuum Arc," CML Technical Report No. 08-014, 2008.
- [50] Zhang, H.-S., and Komvopoulos, K., "Surface Modification by Filtered Cathodic Vacuum Arc and Nanomechanical Properties of Thin-Film Media, Cu-Al-Ni Shape-Memory Alloy, and Surface-Textured Silicon," CML Technical Report No. 09-007, 2009.
- [51] Komvopoulos, K., "Nanoscale Dynamic Analysis of Surface Properties of Biopolymers," Final Report, Grant No. CMS-0528506, National Science Foundation, 2009.

- [52] Komvopoulos, K., “Nanoparticle Monolayers for Enhanced Energy Efficiency and Increased Longevity of Catalytic Converters,” KAUST-UCB Final Report, 2009.
- [53] Wang, N., and Komvopoulos, K., “Thermal Stability of Ultrathin Amorphous Carbon Films for Energy-Assisted Magnetic Recording,” CML Technical Report No. 11-010, 2011.
- [54] Wang, N., and Komvopoulos, K., “Incident Angle Effect of Energetic Carbon Ions on Thickness, Morphology, and Structure of Ultrathin Amorphous Carbon Films Deposited by Filtered Cathodic Vacuum Arc,” CML Technical Report No. 11-011, 2011.
- [55] Wang, N., Komvopoulos, K., Rose, F., and Marchon, B., “Structural Stability of Hydrogenated Amorphous Carbon Overcoats Used in Heat-Assisted Magnetic Recording Investigated by Rapid Thermal Annealing,” CML Technical Report No. 12-013, 2012.
- [56] Wang, N., and Komvopoulos, K., “Structure of Ultrathin Amorphous Carbon Films Deposited by Filtered Cathodic Vacuum Arc for Magnetic Recording,” CML Technical Report No. 13-005, 2013.
- [57] Wang, N., and Komvopoulos, K., “The Effect of Deposition Energy on the Growth and Structure of Ultrathin Amorphous Carbon Films Synthesized by Energetic Atoms Examined by Molecular Dynamics Simulations,” CML Technical Report No. 13-016, 2013.
- [58] Matlak, J., and Komvopoulos, K., “Friction of Ultrathin Amorphous Carbon Films Synthesized by Filtered Cathodic Vacuum Arc and Radio-Frequency Sputtering,” CML Technical Report No. 14-003, 2014.
- [59] Xie, J., and Komvopoulos, K., “Effect of Substrate Bias Voltage on Hybridization and Tribomechanical Properties of Ultrathin Amorphous Carbon Films Deposited by Radio-Frequency Sputtering,” CML Technical Report No. 14-004, 2014.
- [60] Ebrahimi, S., Steigmann, D., and Komvopoulos, K., “Peridynamics Analysis of the Nanoscale Friction and Wear Properties of Amorphous Carbon Thin Films,” CML Technical Report No. 14-005, 2014.
- [61] Xie, J., and Komvopoulos, K., “The Role of Duty Cycle of Substrate Pulse Biasing in the Deposition of Amorphous Carbon Ultrathin Films by Filtered Cathodic Vacuum Arc,” CML Technical Report No. 14-011, 2014.
- [62] Xie, J., and Komvopoulos, K., “Thermal Stability of Ultrathin Amorphous Carbon Overcoats for Heat-Assisted Magnetic Recording,” CML Technical Report No. 15-005, 2015.
- [63] Xie, J., and Komvopoulos, K., “Friction, Nanostructure, and Residual Stress of Single-Layer and Multi-Layer Amorphous Carbon Films Deposited by Radio-Frequency Sputtering,” CML Technical Report No. 15-006, 2015.
- [64] Xie, J., and Komvopoulos, K., “The Effect of Argon Ion Beam Irradiation Post-Deposition Treatment on the Thickness and Structure of Ultrathin Amorphous Carbon Films for Magnetic Storage Technology,” CML Technical Report No. 15-007, 2015.
- [65] Xie, J., and Komvopoulos, K., “Bilayer Ultrathin Amorphous Carbon Films Synthesized by Filtered Cathodic Vacuum Arc for Magnetic Storage Technology,” CML Technical Report No. 15-011, 2015.

## C. Books

- [1] Bhatia, C. S., Polycarpou, A. A., Komvopoulos, K., and Menon, A. K., *1999 Interface Tribology Towards 100 Gbit/in<sup>2</sup>*, ASME, New York, 1999.
- [2] Monteiro, P. J. M., Chong, K. P., Larsen-Basse, J., and Komvopoulos, K., *Long Term Durability of Structural Materials: Durability 2000*, Elsevier, Oxford, UK, 2001.
- [3] Komvopoulos, K., *Mechanical Testing of Engineering Materials*, 2<sup>nd</sup> edition, Cognella Inc., San Diego, CA, 2017.

## D. Chapters in Books

- [1] Komvopoulos, K., “Adhesive Wear,” in *Handbook of Lubrication and Tribology, Volume II: Theory and Design*, 2<sup>nd</sup> edition, R. W. Bruce (ed.), Chapter 7, 2012, pp. 7-1–7-21, CRC Press, Boca Raton, FL.

- [2] Vangelatos, Z., Komvopoulos, K., and Grigoropoulos, C. P., “Tailoring 3D Buckling and Post Contact in Microlattice Metamaterials,” in *Developments and Novel Approaches in Biomechanics and Metamaterials*, B. E. Abali and I. Giorgio (eds.), *Advanced Structural Materials*, Vol. 132, Chapter 28, 2020, pp. 471–484, Springer Nature, Switzerland.

## E. Patents

- [1] Feng, Z., Brewer, M., Brown, I. G., and Komvopoulos, K., “Pretreatment Process for Forming a Smooth Surface Diamond Film on a Carbon-Coated Substrate,” *U.S. Patent No. 5,308,661* (3 May 1994).
- [2] Alley, R. L., Howe, R. T., and Komvopoulos, K., “Method of Applying a Monolayer Lubricant to Micromachines,” *U.S. Patent No. 5,403,665* (4 April 1995).
- [3] Komvopoulos, K., Brown, I. G., Wei, B., Anders, S., Anders, A., and Bhatia, C. S., “Surface Treatment of Magnetic Recording Heads,” *U.S. Patent No. 5,476,691* (19 December 1995).
- [4] Komvopoulos, K., Brown, I. G., Wei, B., Anders, S., Anders, A., and Bhatia, C. S., “Surface Treatment of Magnetic Recording Heads,” *U.S. Patent No. 5,838,522* (17 November 1998).
- [5] Komvopoulos, K., Brown, I. G., Wei, B., Anders, S., Anders, A., and Bhatia, C. S., “Surface Treatment of Ceramic Articles,” *U.S. Patent No. 5,851,475* (22 December 1998).
- [6] Komvopoulos, K., Pruitt, L., Klapperich, C., and Kaplan, S. L., “Plasma-Assisted Surface Modification of Polymers for Medical Device Applications,” *U.S. Patent No. 6,379,741* (30 April 2002).
- [7] Komvopoulos, K., Pruitt, L., Klapperich, C., and Kaplan, S. L., “Plasma-Assisted Surface Modification of Polymers for Medical Device Applications,” *U.S. Patent No. 6,685,743* (2 February 2004).
- [8] Komvopoulos, K., and Tajima, S., “Method for Depositing Fluorocarbon Films on Polymer Surfaces,” *U.S. Patent No. 7,879,418* (1 February 2011).
- [9] Komvopoulos, K., and Tajima, S., “Modification of Polymer Surface with Shielded Plasma,” *U.S. Patent No. 8,168,074* (1 May 2012).
- [10] Komvopoulos, K., and Tajima, S., “Method to Control Cell Adhesion and Growth on Biopolymer Surfaces,” *U.S. Patent No. 8,927,283* (6 January 2015).

## F. Other

- [1] Komvopoulos, K., *Mechanical Behavior of Engineering Materials* (ME 224), Course Reader, 2006.
- [2] Komvopoulos, K., *Fundamentals of Tribology and Contact Mechanics* (ME 226), Course Reader, 2006.
- [3] Komvopoulos, K., *Fatigue and Fracture of Engineering Materials* (ME 225), Course Reader, 2005.