

CURRICULUM VITAE
Krishna Muralidharan
Associate Professor
Department of Materials Science and Engineering
University of Arizona

CHRONOLOGY OF EDUCATION

Doctorate of Philosophy, Materials Science and Engineering
University of Arizona, August 2004
 Minor: Chemistry
 Dissertation: Molecular Dynamics Simulations of Brittle Fracture in Amorphous Silica

Master of Science, Materials Science and Engineering
University of Florida, August 2000
 Thesis: Molecular Dynamics Studies of Bulk Self-Diffusion in β -SiC

M.Sc., Physics
Indian Institute of Technology- Madras, India, June 1997
 Thesis: Magnetic Susceptibility and Electrical Resistivity of Rare Earth-Transition Metal Alloys

B.Sc Physics
 University of Madras, Madras, India, June 1995

CHRONOLOGY OF EMPLOYMENT

05/16-present Associate Professor, Department of Materials Science and Engineering
University of Arizona, Tucson, AZ

08/10-05/16 Assistant Professor, Department of Materials Science and Engineering
University of Arizona, Tucson, AZ

10/07-08/10 Assistant Research Professor, Department of Materials Science and Engineering
University of Arizona, Tucson, AZ

04/06-10/07 Research Associate, Department of Materials Science and Engineering
University of Arizona, Tucson, AZ

11/04-04/06 Postdoctoral Associate, Quantum Theory Project
University of Florida (UF), Gainesville, FL

09/04-03/05 Postdoctoral Fellow, Department of Physics (concurrent with appointment at UF)
University of New Mexico, Albuquerque, NM

02/03-08/04 Staff Member/Graduate Research Assistant, MST 8, **Los Alamos National Labs**
Los Alamos, NM

SERVICE AND OUTREACH

Local/State Outreach

- Hosted two lectures on energy sustainability to the general public (UA Science Café, Spring 2012) and high-school students (UA Science Café, Fall 2011).
- Interviewed and featured in two articles on renewable energy storage by the Arizona Daily Star (2011).

National/International Outreach

- Featured on PBS, Phoenix regarding compressed air energy storage in Spring 2011.

Departmental Committees

- Student Advisory Committee (Advising Junior students since 2014).
- Serving on the Undergraduate Course Committee (UCC) from 2011. Chair of the UCC since 2015.
- MSE faculty in-charge of the Engineering camp for high school students (2017)

University Committees

- Serving on the University-wide Research Computing Council.
- Faculty search committee for positions in LPL, Chemical and Environmental Engineering, Materials Science and Engineering

Professional Service

- Reviewer for Journal Articles (Journals listed below)
Philosophical Magazine, Journal of crystal growth, Applied Physics Letters, AIP Advances, J. Acoustical Society of America, Journal of Physics, Theoretical Chemistry Accounts, Chemical Physics Letters, J. Non-crystalline solids, Philosophical Transactions, Solid-State Ionics, J. Phys: Condensed Matter, Solid-state communications, Modeling and Simulation in MSE, Physica B, Surface Science, Journal of Chemical Physics, Computational Materials Science, Applied Physics Letters, Scientific Reports, Physica E, Materials Research Express, Materials Corrosion, Materials Science and Engineering B, ACS Nano, Optics Express, Ionics, Nanocomposites, J. Physical Chemistry
- Reviewer for NSF-SEES Panel
- Reviewer for NASA-Emerging Worlds
- Reviewer for NSF-DMR-Career
- Reviewer for DOE-Basic Energy Sciences

Conferences/Workshop Organization

- Symposium organizer, Glass and Optical Materials Division, American Ceramic Society (2017)
- Session chair, Glass and Optical Materials Division, American Ceramic Society (2017)
- Session chair Pacrim, American Ceramic Society (2017).
- Lead organizer for the 2-day workshop on Integrated Computational Materials Science and Engineering.” Jointly hosted by University of Arizona and Sandia National Labs
- Co-chair: “Thermofluids and Thermodynamics of Fluid Systems” at the 5th International Conference on Energy Sustainability, ASME, Washington DC 2011.

PUBLICATIONS**BOOKS AND BOOK CHAPTERS**

1. Co-Editor with P.A. Deymier and Keith Runge, *Multiscale paradigms in integrated computational materials science and engineering*, Springer (2016)
2. Consistent Embedding Frameworks for Predictive Multi-theory Multiscale Simulations: Chapter in *Multiscale paradigms in integrated computational materials science and engineering*, Springer (2016) Krishna Muralidharan, K. Runge, P.A. Deymier
3. Interatomic Potentials Including Chemistry: Chapter in *Multiscale paradigms in integrated computational materials science and engineering*, Springer (2016) S.M. Valone, Krishna Muralidharan, K. Runge
4. Atomistic simulation methods: *SPIE/ASME handbook of nanotechnology (chapter 8), section: nanometer structure theory, modeling and simulation (2003)* P. A. Deymier, V. Kapila, Krishna Muralidharan
5. Nanoscale Phononic Crystals and Structures: Chapter 9 in *Acoustic metamaterials and phononic crystals* (ed. P. A. Deymier), Springer series in solid-state sciences, (2012) N. Swindeck, Krishna Muralidharan, P. Deymier, R. Erdmann

PEER-REVIEWED ARTICLES (AS INDEXED ON ISI-WEB OF KNOWLEDGE)

1. Huang, WJ, Bringuier S, Paul J, Potter K-S, Muralidharan K, Potter BG, "An atomistic assessment of the impact of flaw orientation on the elastic and failure behavior of single-crystal Si nanometre-thick slabs," *Philosophical Magazine* (2017) (<http://dx.doi.org/10.1080/14786435.2017.1340686>)
2. Ma D, Sandoval, S, Raghavan S, Muralidharan K, "Effect of surface preparation of copper on spin-coating driven self-assembly of fullerene molecules," *Microelectronic Engineering*, 170 8-15 (2017).
3. Weisbart C, Raghavan S, Muralidharan K, Potter BG, "Electrocoagulation driven fabrication of graphene oxide films" *Carbon*, 116 318-324 (2017)
4. Gur S, Bringuier S, Manga VR, Muralidharan K, Frantziskonis G, "Evolution of internal strain in austenite phase during thermally induced martensitic phase transformation in NiTi shape memory alloys" *Computational Materials Science* 133, 52-59 (2017)
5. Sadat MR, Bringuier S, Asaduzzaman A, Muralidharan K, Zhang, L, "A molecular dynamics study of the role of molecular water on the structure and mechanics of amorphous geopolymer binders," *J. Chemical Physics*, 145(13), 134706 (2016)
6. Pham D, Dycus JH, LeBeau JM, Manga VR, Muralidharan K, Corral E, "Processing Low-Oxide ZrB₂ Ceramics with High Strength Using Boron Carbide and Spark Plasma Sintering," *J. American Ceramic Society* 99(8), 2585 (2016).
7. Dubus B, Swintek N, Muralidharan K, Vasseur J, Deymier PA, "Nonlinear Phonon Modes in Second-Order Anharmonic Coupled Monoatomic Chains," *J. Vibrations and Acoustics*, 138(4) 041016 (2016).
8. Al-Sayoud AQ, Manga VR, Edwards AN, Deymier PA, Muralidharan K, Potter BG, Runge K, Lucas P, "Structure of ZnCl₂ Melt. Part I: Raman Spectroscopy Analysis Driven by Ab Initio Methods," *J. Physical Chemistry B*, 120(17), 4174 (2016).
9. Asaduzzaman A, Runge K, Deymier PA, Muralidharan K, "The Role of Aluminum Substitution on the Stability of Substituted Polyhedral Oligomeric Silsesquioxanes," *Zeitschrift Fur Physikalische Chemie* 230(S1), 1005 (2016).
10. Manga VR, Swintek N, Bringuier S, Lucas P, Deymier P, Muralidharan K, "Interplay between structure and transport properties of molten salt mixtures of ZnCl₂-NaCl-KCl: A molecular dynamics study," *J. Chemical Physics*, 144(9). 094501 (2016).
11. Sadat MR, Bringuier S, Asaduzzaman A, Muralidharan K, Zhang L, "An atomistic characterization of the interplay between composition, structure and mechanical properties of amorphous geopolymer binders," *J. Non-crystalline solids*, 434, 53(2016).
12. Bringuier S, Manga VR, Runge K, Deymier PA, Muralidharan K, An atomic scale characterization of coupled grain boundary motion in silicon bicrystals, *PHILOSOPHICAL MAGAZINE* Volume: 95 Issue: 36 Pages: 4118-4129 Published: DEC 22 2015
13. Deymier PA, Runge K, Swintek N, Muralidharan K, Torsional topology and fermion-like behavior of elastic waves in phononic structures, *COMPTEs RENDUS MECANIQUE* Volume: 343 Issue: 12 Pages: 700-711 Published: DEC 2015

14. Energetics of substituted polyhedral oligomeric silsesquioxanes: a DFT study, Asaduzzaman A, Runge K, Muralidharan K, Deymier PA, Zhang L, MRS COMMUNICATIONS Volume: 5 Issue: 3 Pages: 519-524 Published: SEP 2015
15. Sridhar D, Balakrishnan K, Gnanaprakasa TJ, Raghavan S, Muralidharan K, Self-assembled fullerene additives for boosting the capacity of activated carbon electrodes in supercapacitors, RSC ADVANCES Volume: 5 Issue: 78 Pages: 63834-63838 Published: 2015
16. Bringuier S, Manga VR, Runge K, Deymier P, Muralidharan K, "Grain boundary dynamics of SiC bicrystals under shear deformation," MATERIALS SCIENCE AND ENGINEERING A Volume: 634 Pages: 161-166 Published: MAY 14 2015.
17. *Asaduzzaman A, Muralidharan K, Ganguly J, "Incorporation of water into olivine during nebular condensation: Insights from density functional theory and thermodynamics, and implications for phyllosilicate formation and terrestrial water inventory," METEORITICS & PLANETARY SCIENCE Volume: 50 Issue: 4 Pages: 578-589 Published: APR 2015
18. Gnanaprakasa TJ, Sridhar D, Zega T, Potter BG, Beck W, Runge K, Deymier PA, Raghavan S, Muralidharan K, "Graphene mediated self-assembly of fullerene nanorods," CHEMICAL COMMUNICATIONS Volume: 51 Issue: 10 Pages: 1858-1861 Published: JAN 2015.
19. Gnanaprakasa TJ, Gu Y, Eddy SK, Han ZX, Raghavan S, Muralidharan K, "The role of copper pretreatment on the morphology of graphene grown by chemical vapor deposition," MICROELECTRONIC ENGINEERING Volume: 131 Pages: 1-7 Published: JAN 5 2015
20. *Asaduzzaman, A. M.; Zega, T. J.; Laref, Slimane, Runge K, Deymier P, Muralidharan K, "A computational investigation of adsorption of organics on mineral surfaces: Implications for organics delivery in the early solar system," EARTH AND PLANETARY SCIENCE LETTERS Volume: 408 Pages: 355-361 Published: DEC 15 2014
21. Guerder, Pierre-Yves; Deymier-Black, Alix C.; Swintec, Nicholas Z, Muralidharan K, Vasseur J. Deymier P., "Multi-phonon scattering processes in one-dimensional anharmonic biological superlattices: Understanding the dissipation of mechanical waves in mineralized tissues," JOURNAL OF THE MECHANICAL BEHAVIOR OF BIOMEDICAL MATERIALS Volume: 37 Pages: 24-32 Published: SEP 2014
22. Trzaskowski, Bartosz; Adamowicz, Ludwik; Beck, Warren, Muralidharan K, Deymier P., "Exploring structures and properties of new geodesic polyarenes," CHEMICAL PHYSICS LETTERS Volume: 595 Pages: 6-12 Published: MAR 18 2014
23. Manga VR, Bringuier S, Paul J, Jayaraman S, Lucas P, Deymier PA, Muralidharan K, "Molecular dynamics simulations and thermodynamic modeling of NaCl-KCl-ZnCl₂ ternary system" CALPHAD-COMPUTER COUPLING OF PHASE DIAGRAMS AND THERMOCHEMISTRY Volume: 46 Pages: 176-183 Published: SEP 2014.
24. Deymier PA, Swintec N, Muralidharan K, Runge K, "Rotational modes in a phononic crystal with Fermion like behavior," JOURNAL OF APPLIED PHYSICS Volume: 115 Issue: 16 Article Number: 163510 Published: APR 28 2014
25. Laref, S, Cao J, Asaduzzaman A, Runge K, Deymier PA, Ziolkowski R, Miyawaki M, Muralidharan K, "Size-dependent permittivity and intrinsic optical anisotropy of nanometric gold thin films: a density functional theory study," OPTICS EXPRESS, 21(10), 11827-11838 (2013).

26. Campbell SD, Ziolkowski RW, Cao J, Muralidharan K, Deymier PA, “Anisotropic permittivity of ultra-thin crystalline Au films: Impacts on the plasmonic response of metasurfaces,” APPLIED PHYSICS LETTERS 103(9), 091106 (2013).
27. Laref S, Asaduzzaman A, Beck W, Deymier PA, Runge K, Adamowicz L, Muralidharan K, “Characterization of graphene–fullerene interactions: Insights from density functional theory,” CHEM. PHYS LETT (2013). <http://dx.doi.org/10.1016/j.cplett.2013.07.033>
28. Trzaskowski B, Adamowicz L, Beck W, Muralidharan K, Deymier PA, “Impact of Local Curvature and Structural Defects on Graphene–C60 Fullerene Fusion Reaction Barriers” J.PHYSICAL CHEMISTRY C (2013). DOI: 10.1021/jp405301e
29. Swintek N, Muralidharan K, Deymier PA, “Phonon Scattering in One-Dimensional Anharmonic Crystals and Superlattices: Analytical and Numerical Study,” J. VIBRATIONS AND ACOUSTICS-TRANSACTIONS OF ASME, 135, 041016 (2013)
30. *Vattuone L, Smeriri M, Savio L, Asaduzzaman AM, Muralidharan K, Rocca M, “Accretion disc origin of water,” PHIL. TRANS. R. SOC. A, 371 20110585 (2013).
31. *Asaduzzaman A, Laref S, Runge K, Deymier PA, Cheng H-P, Drake MJ, Muralidharan K, “A first-principles characterization of water adsorption on forsterite grains,” PHIL. TRANS. R. SOC. A, 371 20110582 (2013).
32. Proczka JJ, Muralidharan K, Villela D, Simmons JH, Frantziskonis G, “Guidelines for the pressure and efficient sizing of pressure vessels for compressed air energy storage,” ENERGY CONVERSION AND MANAGEMENT Volume: 65 Special Issue: SI Pages: 597-605 DOI: 10.1016/j.enconman.2012.09.013 Published: JAN 2013
33. Muralidharan K, Erdmann RG, Runge K, Deymier PA, “Asymmetric energy transport in defected boron nitride nanoribbons: Implications for thermal rectification,” AIP ADVANCES Volume: 1 Issue: 4 Article Number: 041703 DOI: 10.1063/1.3675924 Published: DEC 2011
34. Bringuier S, Swintek N, Vasseur JO, Robillard JF, Runge K, Muralidharan K, Deymier PA, “Phase-controlling phononic crystals: Realization of acoustic Boolean logic gates,” JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA Volume: 130 Issue: 4 Pages: 1919-1925 DOI: 10.1121/1.3631627 Part: Part 1 Published: OCT 2011
35. Robillard JF, Bucay J, Deymier PA, Shelke A, Muralidharan K, Merheb B, Vasseur JO, Sukhovich A, Page JH, “Resolution limit of a phononic crystal superlens,” PHYSICAL REVIEW B Volume: 83 Issue: 22 Article Number: 224301 DOI: 10.1103/PhysRevB.83.224301 Published: JUN 9 2011
36. Bringuier S, Swintek N, Vasseur JO, Robillard JF, Runge K, Muralidharan K, Deymier PA, “Phase-controlling phononic crystal,” APPLIED PHYSICS LETTERS Volume: 98 Issue: 10 (2011)
37. Robillard JF, Muralidharan K, Bucay J, Deymier PA, Beck W, Barker D, “Phononic Metamaterials for Thermal Management: An Atomistic Computational Study,” CHINESE JOURNAL OF PHYSICS Volume: 49 Issue: 1 Special Issue: SI Pages: 448-461 Published: FEB 2011.
38. *de Leeuw NH, Catlow CRA, King HE, Putnis A, Muralidharan K, Deymier P, Stimpfl M, Drake MJ, “Where on Earth has our water come from?,” CHEMICAL COMMUNICATIONS Volume: 46 Issue: 47 Pages: 8923-8925 DOI: 10.1039/c0cc02312d Published: 2010

39. Mishra SK, Deymier PA, Muralidharan K, Frantziskonis G, Pannala S, Simunovic S, "Modeling the coupling of reaction kinetics and hydrodynamics in a collapsing cavity," *ULTRASONICS SONOCHEMISTRY* Volume: 17 Issue: 1 Pages: 258-265 DOI: 10.1016/j.ultsonch.2009.05.014 Published: JAN 2010
40. Merheb B, Deymier PA, Muralidharan K, Bucay J, Jain M, Alohyna-Lesuffleur M, Greger RW, Mohanty S, Berker A, "Viscoelastic effect on acoustic band gaps in polymer-fluid composites," *MODELLING AND SIMULATION IN MATERIALS SCIENCE AND ENGINEERING* Volume: 17 Issue: 7 Article Number: 075013 DOI: 10.1088/0965-0393/17/7/075013 Published: OCT 2009
41. Bucay J, Roussel E, Vasseur JO, Deymier PA, Hladky-Hennion AC, Pennec Y, Muralidharan K, Djafari-Rouhani B, Dubus B, "Positive, negative, zero refraction, and beam splitting in a solid/air phononic crystal: Theoretical and experimental study," *PHYSICAL REVIEW B* Volume: 79 Issue: 21 Article Number: 214305 DOI: 10.1103/PhysRevB.79.214305 Published: JUN 2009
42. Sukhovich A, Merheb B, Muralidharan K, Vasseur JO, Pennec Y, Deymier PA, Page JH, "Experimental and Theoretical Evidence for Subwavelength Imaging in Phononic Crystals," *PHYSICAL REVIEW LETTERS* Volume: 102 Issue: 15 Article Number: 154301 DOI: 10.1103/PhysRevLett.102.154301 Published: APR 17 2009
43. *Muralidharan K, Stimpfl M, Deymier P, de Leeuw NH, Drake MJ, "Origin of water in the inner Solar System: A kinetic Monte Carlo study of water adsorption on forsterite," *ICARUS* Volume: 198 Issue: 2 Pages: 400-407 DOI: 10.1016/j.icarus.2008.07.017 Published: DEC 2008
44. Frantziskonis, G, Muralidharan, K., Deymier, P.; Simunovic, S, Nukala, P, Pannala, S, "Time-parallel multiscale/multiphysics framework," *JOURNAL OF COMPUTATIONAL PHYSICS* Volume: 228 Issue: 21 Pages: 8085-92 Published: 20 Nov. 2009
45. Mishra, S.K, Muralidharan, K, Pannala, S, Simunovic, S, Daw, C.S, Nukala, P, Fox, R, Deymier, P.A, Frantziskonis, G, "Spatiotemporal compound wavelet matrix framework for multiscale/multiphysics: case study of a heterogeneous reaction/diffusion system," *INTERNATIONAL JOURNAL OF CHEMICAL REACTOR ENGINEERING* Volume: 6 Pages: 43 pp. Published: 01 2008
46. Muralidharan K, Mishra SK, Frantziskonis G, Deymier PA, Naula P, Simunovic S, Pannala S, "Dynamic compound wavelet matrix method for multiphysics and multiscale problems," *PHYSICAL REVIEW E* Volume: 77 Issue: 2 Article Number: 026714 DOI: 10.1103/PhysRevE.77.026714 Part: Part 2 Published: FEB 2008
47. Mishra SK, Muralidharan K, Deymier PA, Frantziskonis G, Pannala S, Simunovic S, "Wavelet-Based Spatial Scaling of Coupled Reaction-Diffusion Fields," *INTERNATIONAL JOURNAL FOR MULTISCALE COMPUTATIONAL ENGINEERING* Volume: 6 Issue: 4 Pages: 281-297 Published: 2008
48. Muralidharan K, Torras J-T, Trickey SB, "Energetics and mechanical properties of silica nanotubes," *JOURNAL OF PHYSICS-CONDENSED MATTER* Volume: 19 Issue: 38 Article Number: 386238 DOI: 10.1088/0953-8984/19/38/386238 Published: SEP 26 2007
49. Torras J-T, He Y, Cao C, Muralidharan K, Deumens E, Cheng HP, Trickey SB, "PUPIL: A systematic approach to software integration in multi-scale simulations," *COMPUTER PHYSICS COMMUNICATIONS* Volume: 177 Issue: 3 Pages: 265-279 DOI: 10.1016/j.cpc.2007.01.009 Published: AUG 1 2007
50. Muralidharan K, Oh K-D, Deymier PA, Runge K, Simmons JH, "Molecular dynamics simulations of atomic-level brittle fracture mechanisms in amorphous silica," *JOURNAL OF MATERIALS SCIENCE* Volume: 42 Issue: 12 Pages: 4159-4169 DOI: 10.1007/s10853-007-1638-2 Published: JUN 2007

51. Muralidharan K, Cao C, Wan YX, Runge K, Cheng HP, "Environment dependent dynamic charge potential for silica: Application to nanoscale silica structures," CHEMICAL PHYSICS LETTERS Volume: 437 Issue: 1-3 Pages: 92-98 DOI: 10.1016/j.cplett.2007.01.081 Published: MAR 22 2007
52. Deymier PA, Oh KD, Muralidharan K, Frantziskonis G, Runge K, "Selection of domains for coarse and fine levels of description in mixed-potential simulations," JOURNAL OF COMPUTER-AIDED MATERIALS DESIGN Volume: 13 Issue: 1-3 Pages: 17-44 DOI: 10.1007/s10820-006-9013-1 Published: OCT 2006
53. Muralidharan K, Mallik A, Runge K, Deymier PA, "Implementation of consistent embedding for a larger system - Amorphous silica," JOURNAL OF COMPUTER-AIDED MATERIALS DESIGN Volume: 13 Issue: 1-3 Pages: 61-73 DOI: 10.1007/s10820-006-9015-z Published: OCT 2006
54. Cheng HP, Wang LL, Du MH, Cao C, Wan YX, He Y, Muralidharan K, Greenlee G, Kolchin A, "Quantum, classical, and multi-scale simulation of silica-water interaction: molecules, clusters, and extended systems," JOURNAL OF COMPUTER-AIDED MATERIALS DESIGN Volume: 13 Issue: 1-3 Pages: 161-183 DOI: 10.1007/s10820-006-9009-x Published: OCT 2006
55. Muralidharan K, Simmons JH, Deymier PA, Runge K, "Molecular dynamics studies of brittle fracture in vitreous silica: Review and recent progress," JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 351 Issue: 18 Pages: 1532-1542 DOI: 10.1016/j.jnoncrysol.2005.03.026 Published: JUN 15 2005
56. Baskes MI, Muralidharan K, Stan M, Valone SM, Cherne FJ, "Using the modified embedded-atom method to calculate the properties of Pu-Ga alloys," JOM-JOURNAL OF THE MINERALS METALS & MATERIALS SOCIETY Volume: 55 Issue: 9 Pages: 41-50 DOI: 10.1007/s11837-003-0029-7 Published: SEP 2003
57. Muralidharan K, Deymier PA, Simmons JH, "A concurrent multiscale finite difference time domain/molecular dynamics method for bridging an elastic continuum to an atomic system," MODELLING AND SIMULATION IN MATERIALS SCIENCE AND ENGINEERING Volume: 11 Issue: 4 Pages: 487-501 Article Number: DOI: 10.1088/0965-0393/11/4/306 Published: JUL 2003

TECHNICAL REPORTS

Simmons JH, Muralidharan K, University of Arizona Compressed Air Energy Storage, USDOE-DE-OE0000424 (2012)

INVENTION DISCLOSURES AND PROVISIONAL PATENTS

1. Graphene Derived and Chemically Modified Graphene Derived Carbon Fibers (UA, Invention Disclosure-17-186) Krishna Muralidharan, Srini Raghavan and B.G. Potter
2. Electrocoagulation driven fabrication of graphene oxide films and membranes (UA, Invention Disclosure 17-059) Clovis Weisbart, Srini Raghavan, Krishna Muralidharan, B.G. Potter
3. Fullerene-Graphene Based High Efficiency Supercapacitors (UA15-081), Krishna Muralidharan and Srini Raghavan
4. Substrate and Solvent Mediated Synthesis of Fullerene Self-assemblies (UA-15-073), Krishna Muralidharan, Srini Raghavan, Tony J Gnanaprakasa, Deepak Sridhar
5. High Temp Heat Transfer Fluids (250 C - 1000 C) for Use in Energy Capture Systems (UA-14-042)
6. Provisional Patent Application No. 61/695080 was filed on 8/30/2012 for 2001-13838-prov, "Size-dependent Permittivity and Intrinsic Optical Anisotropy of Nanometric Gold Thin Films"

CONFERENCE PROCEEDINGS

1. ORIGIN OF WATER IN EARTH WITH HIGH D/H RATIO RELATIVE TO PROTOSOLAR NEBULA, AND AN EXPLANATION OF ITS SIMILARITY WITH THE ISOTOPIC RATIOS OF CARBONACEOUS

CHONDRITES AND ASTEROID VESTA, Ganguly J, Asaduzzaman A, Muralidharan K, Meteoritics and Planetary Science, 51(S1),A277 (2016).

2. EXPERIMENTAL AND COMPUTATIONAL INVESTIGATION OF MICROCRACK BEHAVIOR UNDER COMBINED ENVIRONMENTS IN MONOCRYSTALLINE SILICON, Huang WJ, Bringuier S, Paull J, Potter KS, Muralidharan K, Potter BG, Proc. SPIE 9563, Reliability of Photovoltaic Cells, Modules, Components, and Systems VIII, 956308
3. SYNTHESIS AND DELIVERY OF AMINO ACIDS TO THE EARLY EARTH VIA SURFACE CATALYSIS: A COMPUTATIONAL STUDY, Asaduzzaman A, Muralidharan K, Zega TJ, Runge K, 45th Lunar and Planetary Science Conference (Article # 1467) 2014
4. NEW PLASMONIC MATERIALS IN VISIBLE SPECTRUM THROUGH ELECTRICAL CHARGING Cao J, Balachandran R, Keswani M, Muralidharan K, Laref S, Ziolkowski R, Runge K, Deymier P, Raghavan S, Miyawaki M,," Proceedings of the SPIE - The International Society for Optical Engineering, Volume: 8632 Pages:86321I (7 pp.) 2013
5. A COMPUTATIONAL EXPLORATION OF THE ATTACHMENT OF ORGANICS TO MINERALS, Asaduzzaman AM, Muralidharan K, Runge K, Zega TJ, 44th Lunar and Planetary Science conference, # 2884, 2013: Publisher: Lunar and Planetary Institute
6. HYDRATION KINETICS OF PERICLASE, Asaduzzaman AM, Muralidharan K, Ganguly, 44th Lunar and Planetary Science conference, # 2396, 2013: Publisher: Lunar and Planetary Institute
7. CHEMICAL PATHWAYS AND MECHANISMS OF WATER ADSORPTION ON OLIVINE GRAINS: EVIDENCE FOR WET ACCRETION OF EARTH, Asaduzzaman AM, Muralidharan K, METEORITICS & PLANETARY SCIENCE Volume: 47 Special Issue: SI Pages: A48-A48 Supplement: 1 Published: JUL 2012
8. FIRST-PRINCIPLES INVESTIGATION OF ADSORPTION OF ORGANIC MOLECULES ON PLANETARY MATERIALS, Asaduzzaman AM, Muralidharan K, Runge K, Zega TJ, METEORITICS & PLANETARY SCIENCE Volume: 47 Special Issue: SI Pages: A47-A47 Supplement: 1 Published: JUL 2012
9. ELECTRONIC STRUCTURE CALCULATIONS OF WATER ADSORPTION ON FORSTERITE GRAINS: IMPLICATIONS FOR PLANETARY WATER, Muralidharan K, Drake MJ, METEORITICS & PLANETARY SCIENCE Volume: 46 Special Issue: SI Pages: A170-A170 Supplement: 1 Published: JUL 2011
10. WATER IN THE INNER SOLAR SYSTEM: INSIGHTS FROM ATOMISTIC AND ELECTRONIC STRUCTURE CALCULATIONS, Muralidharan K, Stimpfl M, de Leeuw NH, Deymier PA, Runge K, Drake MJ, METEORITICS & PLANETARY SCIENCE Volume: 44 Pages: A136-A136 Supplement: S Published: JUL 200
11. CONSISTENT EMBEDDING: A MULTISCALE APPROACH TO BRITTLE FRACTURE, K. Runge, K. Muralidharan, and P.A. Deymier, Materials Science & technology 2011, Symposium on Nano- and Atomic-scale Fracture, Oct. 16-20, 2011 Columbus, Ohio.
12. SMALL-SCALE SCALABLE CAES SYSTEM WITH THERMAL MANAGEMENT, J.H.Simmons, K. Muralidharan, G. Frantziskonis, Y. Son, Electrical energy Storage Applications and Technologies, San Diego, October, 2011.
13. ATOMISTIC SIMULATIONS OF ADSORPTION OF WATER ONTO FORSTERITE AND FAYALITE PLANAR SURFACES, M. Stimpfl, Muralidharan K, de Leeuw N, Deymier PA, Runge K, Drake MJ, 41st Lunar and Planetary Science conference, # 2493, 2011: Publisher: Lunar and Planetary Institute

14. HIGH-EFFICIENCY COMPRESSED AIR ENERGY STORAGE SYSTEMS FOR STAND-ALONE PV PANELS, D. Villela, S. de Valle, M. Alvarez, Krishna Muralidharan, P. Deymier, G. Frantziskonis, IEEE Photovoltaics, Hawaii (2010)
15. SOME - PERHAPS MOST - WATER IN THE EARTH MUST RESULT FROM ADSORPTION ON TO GRAINS IN THE ACCRETION DISK, K. Muralidharan, Stimpfl M. de Leeuw N. H. Deymier P. A. Runge K. Drake M. J, 41st Lunar and Planetary Science conference, # 1882, 2009: Publisher: Lunar and Planetary Institute
16. ADSORPTION AS A WATER DELIVERY SOURCE IN THE INNER SOLAR SYSTEM: A KINETIC MONTE CARLO STUDY, K. Muralidharan, P. A. Deymier, M. Stimpfl, M. J. Drake, 40th Lunar and Planetary Science conference, # 1882, 2008: Publisher: Lunar and Planetary Institute
17. WAVELET BASED SPATIAL SCALING OF COUPLED REACTION DIFFUSION FIELDS, S. K. Misra, Krishna Muralidharan, P. A. Deymier, , G. Frantziskonis, S. Pannala, S. Simunovic, Lecture Notes in Computer Science, ICCS-2008, 5102, 301-310, 2008
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20. EXPERIMENTAL AND SIMULATION INVESTIGATIONS OF ACOUSTIC CAVITATION IN MEGASONIC CLEANING, Krishna Muralidharan, M. Keswani, S. Raghavan, P. Deymier, F. Eschbach, A. Sengupta, Proc. of SPIE- V6517, Emerging Lithographic Technologies XI March 15 2007
21. REMOVAL OF GOLD PARTICLES FROM CHROMIUM OXYNITRIDE SURFACES USING DILUTE SULFURIC ACID SOLUTIONS, V. Pandit, M. Keswani, S. Raghavan, Krishna Muralidharan, P. Deymier, F. Eshbach, A.Sengupta, H. Yun, Electrochemical Society Transactions 11 (2) 471, 2007
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1. SHAPE SHIFTING FULLERENE SELF-ASSEMBLIES FOR SUPERCAPACITOR APPLICATIONS, Deepak Sridhar, Tony J. Gnanaprakasa, Selene Sandoval, Srini Raghavan, Krishna Muralidharan, TMS, Nashville, Feb 14-18, 2016.
2. TRANSPORT AND STOKES-EINSTEIN BEHAVIOR IN MOLTEN MIXTURES OF NETWORK-FORMERS AND NETWORK-MODIFIERS, VR. Manga, N. Swintek, S. Bringuier, P. Deymier, K. Muralidharan, TMS, Nashville, Feb 14-18, 2016.
3. AB INITIO MOLECULAR DYNAMICS STUDY OF SPECIATION IN $AlCl_3$ - $ZnCl_2$ -BASED NETWORK FORMING LIQUIDS, VR. Manga, Abduljabar Alsayoud, S. Bringuier, P. Lucas, P. Deymier, K. Muralidharan, TMS, Nashville, Feb 14-18, 2016.
4. MECHANICALLY ROBUST, THERMALLY INSULATING LINING FOR UNDERGROUND MINES, Krishna Muralidharan, M. Momayez, SME, Phoenix, Feb 24-28, 2016
5. SURFACE MEDIATED SYNTHESIS OF RECONFIGURABLE SHAPE-SHIFTING NANOSCALE TO MICROSACLE FULLERENE SELF-ASSEMBLIES FOR ENERGY APPLICATIONS, S. Sandoval, Tony J. Gnanaprakasa, Dongni Ma, P. Deymier, Srini Raghavan, Krishna Muralidharan, MRS Spring Meeting, Phoenix, Mar 28-Apr 1, 2016.
6. ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIAL, Abduljabar Al-Sayoud, K. Runge, P. Deymier, Krishna Muralidharan, (poster), MRS Spring Meeting, Phoenix, Mar 28-Apr 1, 2016.
7. SI MICROCRACK EVOLUTION UNDER COMBINED ENVIRONMENTS: AN EXPERIMENTAL AND COMPUTATIONAL STUDY, W-J Huang, S. Bringuier, J. Paul, K-S. Potter, K. Muralidharan, BG. Potter, (poster), MRS Spring Meeting, Phoenix, Mar 28-Apr 1, 2016.
8. EFFECT OF SURFACE PREPARATION OF COPPER ON SELF-ASSEMBLY OF FULLERENE MOLECULES, Dongni Ma, Selene Sandoval, Krishna Muralidharan, Srini Raghavan, SPCC 2016, San Jose, Apr 18-20, 2016.
9. AN ENVIRONMENT DEPENDENT DYNAMIC CHARGE INTERATOMIC POTENTIAL FOR MODELING NANO AND BULK SILICA POLYMORPHS, Krishna Muralidharan, K. Runge, GOMD 2016, Madison, May 22-26 2016.
10. COMPUTATIONAL MODELING OF SYNTHESIS OF AMORPHOUS SERPENTINE FROM OLIVINE: IMPLICATIONS FOR PLANETARY WATER DELIVERY AND FORMATION OF HYDROUS MINERALS IN THE SOLAR NEBULA, Abu Asaduzzaman, Krishna Muralidharan, J Ganguly, GOMD 2016, Madison, May 22-26 2016.
11. ELECTROCHEMICAL SYNTHESIS OF MULTIFUNCTIONAL GRAPHENE OXIDE FILMS, Clovis Weisbart, Srini Raghavan, Krishna Muralidharan, B.G. Potter, MS&T, Salt Lake City, Oct 23-27 2016

12. MOLECULAR DYNAMICS STUDIES OF VISCOSITY AND THERMAL CONDUCTIVITY OF NaCl-KCl-ZnCl₂ MELTS,
VR. Manga, N. Swintek, S. Bringuier, P. Deymier, K. Muralidharan, 144th Annual TMS meeting, Orlando, March 2015
13. STRUCTURAL CHARACTERIZATION OF ZnCl₂ BASED MOLTEN SALTS USING RAMAN SPECTROSCOPY AND QUANTUM CHEMICAL METHODS,
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14. ANISOTROPY IN THE TRANSFORMATION DYNAMICS OF AUSTENITE (B2) TO MARTENSITE (B19') ASSOCIATED WITH SUPERELASTICITY IN NiTi,
S. Gur, **VR. Manga**, St. Bringuier, K. Muralidharan, G. Frantziskonis, 144th Annual TMS meeting, Orlando, March 2015
15. AN INTEGRATED ATOMISTICS-CALPHAD FRAMEWORK FOR MODELING THE NaCl-KCl-ZnCl₂-AlCl₃ QUATERNARY SYSTEM,
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16. THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF NANOMETRIC ALKALI OXIDE LAYERS ON SILICON AS LOW WORK FUNCTION ELECTRODES FOR THERMIONIC CONVERTERS,
A. Asaduzzaman, F. Morini, V. Giorgis, E. Dubois, J-F. Robillard, P. Deymier, **K. Muralidharan**, , 144th Annual TMS meeting, Orlando, March 2015
17. GRAPHENE SUBSTRATE MEDIATED SELF-ASSEMBLY OF ALIGNED FULLERENE NANORODS,
TJ. Gnanaprakasa, D. Sridhar, TJ. Zega, BG. Potter, P. Deymier, S. Raghavan, K. Muralidharan, MS&T, Pittsburgh, October 2014.
18. COHERENT THERMAL PHONONS IN Si-Ge NANOSCALE PHONONIC CRYSTALS,
N. Swintek, **K. Muralidharan**, P. Deymier, European-MRS meeting, Lille, France, May 2014
19. TAILORING THERMAL CONDUCTIVITY OF GRAPHENE VIA DEFECT AND MOLECULAR ENGINEERING,
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20. THERMODYNAMIC MODELING MIXED IONIC SYSTEMS,
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21. STRUCTURE AND THERMODYNAMICS OF MOLTEN SALT MIXTURES,
VR. Manga, S. Bringuier, J. Paul, S. Jayaraman, P. Lucas, P. Deymier, K. Muralidharan, 143rd Annual TMS meeting, San Diego, 02/16-02/20/14
22. ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIALS (EDD-Q): A HIERARCHICAL APPROACH FOR ATOMISTIC MODELING OF CLUSTERS TO SOLIDS,
K. Muralidharan, K. Runge, PA. Deymier, 143rd Annual TMS meeting, San Diego, 02/16-02/20/14

23. SYNTHESIS AND DELIVERY OF AMINO ACIDS TO THE EARLY EARTH VIA SURFACE CATALYSIS: A COMPUTATIONAL STUDY (*POSTER*),
AM. Asaduzzaman, K. Runge, T.J. Zega, K. Muralidharan, 45th Lunar and Planetary Science Conference, Houston, 03/17-03/21/14
24. THE ROLE OF COPPER PRE-TREATMENT ON THE MORPHOLOGY OF GRAPHENE GROWN BY CHEMICAL VAPOR DEPOSITION,
TJ. Gnanaprakasa, Y. Gu, SK. Eddy, Z.Han, W. Beck, K. Muralidharan, S. Raghavan, SEMATECH Surface Preparation and Cleaning Conference, Austin, 04/22-04/24/14
25. A COMPUTATIONAL EXPLORATION OF THE ATTACHMENT OF ORGANICS TO MINERALS (*POSTER*),
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26. HYDRATION KINETICS OF PERICLASE: QUANTUM CHEMICAL CALCULATIONS AND IMPLICATIONS FOR THE TIMESCALE OF FORMATION OF THE SOLAR NEBULA (*POSTER*),
AM. Asaduzzaman, **K. Muralidharan**, J. Ganguly, 44th Lunar and Planetary Science Conference, Houston, 03/05-03/10/13
27. THE ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIAL,
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28. THERMODYNAMICS OF NA₂CO₃-K₂CO₃-ZnO MOLTEN MIXTURES FROM MOLECULAR DYNAMICS SIMULATIONS,
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S. Bringuier, VR. Manga, P. Deymier, K. Muralidharan, LAMMPS Users' Workshop and Symposium Series, 2013, Albuquerque, 08/07/13
30. MECHANICAL FAILURE IN SIC BICRYSTALS,
S. Bringuier, VR. Manga, P. Deymier, K. Muralidharan, MS&T, 2013, Montreal, Canada 11/1/13
31. MOLECULAR ASSEMBLY OF GRAPHENE/FULLERENE NANOSTRUCTURES,
TJ. Gnanaprakasa, W. Beck, BG. Potter, K. Runge, P. Deymier, K. Muralidharan, MS&T, 2013, Montreal, Canada 11/1/13
32. THERMODYNAMIC MODELING OF MOLTEN SALTS FOR CONCENTRATED SOLAR POWER APPLICATIONS: NA₂CO₃-K₂CO₃-ZnO-BASED SYSTEMS,
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33. CHARACTERIZING GRAPHENE-FULLERENE INTERACTIONS: A DENSITY FUNCTIONAL THEORY STUDY
S. Laref, W. Beck, L. Adamowicz, P. Deymier, K. Muralidharan, MRS Fall Meeting, Nov 24-29 2012, Boston
34. METALLIC THIN FILMS WITH TUNABLE OPTICAL PROPERTIES (*POSTER*),
K. Muralidharan, S. Laref, J. Cao, K. Runge, P. Deymier, R. Ziolkowski, M. Miyawaki, MRS Fall meeting, Nov 24-29 2012, Boston, MA

35. THE ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIAL FOR POLARIZABLE MATERIALS
K. Muralidharan, Integrated computational materials Science and Engineering Workshop, Tucson, AZ, 10/15-10/16/12.
36. WET ACCRETION OF EARTH: EXPERIMENTAL AND THEORETICAL EVIDENCE
K. Muralidharan, A. Asaduzzaman, Institute for planets and exoplanets (IPLEX) at UCLA, Los Angeles, CA, 06/12-06/13/12
37. TWO-DIMENSIONAL MATERIALS WITH TUNABLE THERMAL PROPERTIES
K. Muralidharan, R. Erdmann, P.A. Deymier and K. Runge, “MRS Fall meeting, Symposium W: Phonons in Nanomaterials—Theory, Experiments, and Applications, Nov.28-Dec. 2, 2011, Boston.
38. ACCRETION DISK ORIGIN OF EARTH’S WATER: LABORATORY EXPERIMENTS
L. Vattuone, **K. Muralidharan**, M. Rocca, M.J. Drake, 74th Annual meeting of the Meteoritic Society, : Greenwich, England, August, 2011
39. ATOMISTIC AND ELECTRONIC STRUCTURE CALCULATIONS OF WATER ADSORPTION ON FORSTERITE GRAINS: IMPLICATIONS FOR PLANETARY WATER (**INVITED**)
K. Muralidharan, M.J. Drake, The Royal Society Meeting on Surface Science in the Interstellar Medium, Kavli Royal Society International Centre at Chicheley Hall, England, 11th March 2011
40. WATER IN THE INNER SOLAR SYSTEM: INSIGHTS FROM ATOMISTIC AND ELCTRONIC-STRUCTURE CALCULATIONS (*POSTER*)
Krishna Muralidharan, K. Runge, N. H. De Leeuw, P. A. Deymier, M. J. Drake
Presented at 72nd Annual Meeting of the Meteoritical Society, July 13-18, 2009, Nancy, France
41. COMPRESSED AIR ENERGY STORAGE SYSTEMS FOR STAND-ALONE OFF-GRID PHOTO-VOLTAIC MODULES
D. Villela, S. Ashok, Krishna Muralidharan, P. A. Deymier
Presented at Solar Fusion Day, University of Arizona, Aug, 2009, Tucson, AZ
42. SOME-PERHAPS MOST WATER IN THE EARTH MUST RESULT FROM ADSORPTION ON TO GRAINS IN THE ACCRETION DISK
Krishna Muralidharan, P. A. Deymier, M. Stimpfl, N. H. de Leeuw, M. J. Drake
Poster Presentation at Lunar and Planetary Science Conference, Mar 23-27, 2009, Woodlands, TX
43. A COMPUTATIONAL STUDY OF WATER ADSORPTION ON TO FORSTERITE GRAINS,
Krishna Muralidharan, P. A. Deymier, M. Stimpfl, N. H. de Leeuw, M. J. Drake
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44. ADSORPTION AS A WATER DELIVERY SOURCE IN THE INNER SOLAR SYSTEM: A KINETIC MONTE CARLO STUDY (*POSTER*),
Krishna Muralidharan, P. A. Deymier, M. Stimpfl, M. J. Drake
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45. WATER IN THE INNER SOLAR SYSTEM: A KINETIC MONTE CARLO STUDY
Krishna Muralidharan, P. A. Deymier, M. Stimpfl, N. H. De Leeuw, M. J. Drake
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46. FUNDAMENTAL PROCESSES IN MEGASONIC-IRRADIATED FLUIDS: APPLICATIONS TO CLEANING,
Krishna Muralidharan, Presented at SRC/SEMATECH Engineering Research Center for Environmentally Benign Semiconductor Manufacturing, Tucson AZ, 2007
47. ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIAL FOR SILICA
L. Kemper, **Krishna Muralidharan**, Y. Wan, H. P. Cheng
Presented at American Physical Society Annual March Meeting, Mar 11-17, 2006, Baltimore, MD
48. SIMULATION STUDIES OF MECHANICAL PROPERTIES OF NOVEL SILICA NANOSTRUCTURES
Krishna Muralidharan, J. Torras-Costa, S. B. Trickey
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49. A NEW CHARGE-TRANSFER POTENTIAL FOR SILICA
Krishna Muralidharan, Y. Wan, H. P. Cheng
Presented at Sanibel Symposium, Feb 25-Mar 3, 2006, St. Simons Island, GA
50. DYNAMIC CHARGE POTENTIAL FOR WATER
Krishna Muralidharan, K. Runge, S. M. Valone, S. R. Atlas
Presented at South-Eastern Section of the American Physical Society, Nov 9-11, 2005, Gainesville, FL
51. DYNAMICS OF BRITTLE FRACTURE IN SILICA GLASS: A LOOK AT STRUCTURAL REARRANGEMENT MECHANISMS
Krishna Muralidharan, J. H. Simmons, P. A. Deymier
Presented at M. C. Weinberg Symposium, Journal of Non-Crystalline Materials, October 21-23, 2003, Tucson, AZ
52. MODELING BRITTLE FRACTURE IN VITREOUS SILICA: A MULTISCALE QM-MD APPROACH
Krishna Muralidharan, J. H. Simmons, P. A. Deymier
Presented at Glass and Optical Materials Division Fall Meeting, American Ceramic Society, October 2003, Corning, NY
53. ATOMISTIC MODELING OF THE PHASE STABILITY IN THE Pu-Ga SYSTEM
Krishna Muralidharan, M. I. Baskes, Marius Stan and S.G. Srinivasan
Presented at 2003 Minerals, Metals and Materials Society Spring Meeting, March.2-6, 2003, San Diego, CA
54. MULTISCALE MODELING OF WAVE PROPAGATION: FDTD/MD HYBRID METHOD
Krishna Muralidharan, P. A. Deymier, and J. H. Simmons
Presented at 2002 Materials Research Society Spring Meeting, Apr.1-5, 2002, San Francisco, CA
55. LOCAL STABILITY OF INTERFACES BETWEEN DIFFERENT SIZED ATOMS
Krishna Muralidharan and M.I. Baskes
Poster Presentation at Local and Nanoscale Structure in Complex Systems, Jan.27, 2002, Santa Fe NM

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1. ATOMIC RESOLUTION ANALYSIS OF PEROVSKITE FROM THE EARLY SOLAR SYSTEM, TJ Zega, V. Manga, K. Dominik, Krishna Muralidharan," M&M, July 24-28, Columbus, 2016.

2. ORIGIN OF WATER IN EARTH WITH HIGH D/H RATIO RELATIVE TO PROTOSOLAR NEBULA, AND AN EXPLANATION OF ITS SIMILARITY WITH THE ISOTOPIC RATIOS OF CARBONACEOUS CHONDRITES AND ASTEROID VESTA,
J. Ganguly, A. Asaduzzaman, K. Muralidharan, 7^{9th} Annual Meeting of the Meteoritic Society, Berlin 7-11 Aug 2016
3. INCORPORATION OF WATER IN PYROPE,
VR Manga, **M. Mookherjee**, K. Muralidharan, AGU meeting, San Francisco, Dec 2014
4. ACCRETION DISK ORIGIN OF WATER,
Vattuone L, Smeriri M, Savio L, Muralidharan K, Rocca M, 19th International Vacuum congress, Paris France, 09/09/13
5. NEW PLASMONIC MATERIALS IN VISIBLE SPECTRUM THROUGH ELECTRICAL CHARGING
Jiangrong Cao, Rajesh Balachandran, Manish Keswani, Krishna Muralidharan, Slimane Laref, Richard W. Ziolkowski, Keith Runge, Pierre A. Deymier, Srini Raghavan, Mamoru Miyawaki
SPIE Photonics West, San Francisco, Feb 2-7 2013
6. CONSISTENT EMBEDDING: A MULTISCALE APPROACH TO BRITTLE FRACTURE,
K. Runge, K. Muralidharan, and P.A. Deymier, Materials Science & technology 2011, Symposium on Nano- and Atomic-scale Fracture, Oct. 16-20, 2011 Columbus, Ohio.
7. SMALL-SCALE SCALABLE CAES SYSTEM WITH THERMAL MANAGEMENT,
J.H.Simmons, K. Muralidharan, G. Frantziskonis, Y. Son, Electrical energy Storage Applications and Technologies, San Diego, October, 2011.
8. PHONONIC CRYSTALS WITH COMPLETE PHASE SPACE PROPERTIES,
P.A. Deymier, J. Bucay, J-F. Robillard, K. Muralidharan, B. Merheb, J.O Vasseur, A. Sukhovich, J.H. Page, Y. Pennec, B. Djafari-Rouhani, L. Dobrzynski, A-C Hladky, B. Dubus, N. Swintek, S. Bringuier, H. Chandra, A. Khelif, Phononics 2011, Santa Fe, May 29-June 2, 2011.
9. PHASE-CONTROLLING PHONONIC CRYSTAL,
N. Swintek, S. Bringuier, P.A. Deymier, K. Runge, K. Muralidharan, J.O. Vasseur, Phononics 2011, Santa Fe, May 29-June 2, 2011
10. ACOUSTIC MATERIALS: NEGATIVE, POSITIVE AND ZERO REFRACTION AND SUPER-LENSING IN PHONONIC CRYSTALS
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11. ACOUSTIC METAMATERIALS: NEGATIVE, POSITIVE AND ZERO-ANGLE REFRACTION AND SUPERLENSING IN ACOUSTIC CRYSTALS
P. A. Deymier, J. Bucay, B. Mehreb, Krishna Muralidharan, Alexey Sukhovich³, John Page³, J. Vasseur, A.C. Hladky-Hennion, Y. Pennec, B.Jafari-Rouhani, B.Dubus and E.Roussel
2009 Materials Research Society Fall Meeting, Nov30-Dec 3, 2009, Boston, MA
12. PECULIAR REFRACTION PHENOMENA IN A SOLID/AIR PHONONIC CRYSTAL
J. O. Vasseur, J. Bucay, E. Roussel, P. A. Deymier, Y. Pennec, A-C. Hladky-Hennion, K. Muralidharan, B. Djafari-Rouhani, B. Dubus
Presented at IEEE International Ultrasonics, 2009, Rome, Italy
13. WAVELET BASED SPATIAL SCALING OF COUPLED REACTION DIFFUSION FIELDS

S. K. Misra, Krishna Muralidharan, P. A. Deymier, , G. Frantziskonis, S. Pannala, **S. Simunovic**
International Conference on Computational Science (ICCS), June 23-25, 2008, Krakow, Poland

14. PARALLEL-IN-TIME MULTISCALE/MULTIPHYSICS FRAMEWORK
G. Frantziskonis, Krishna Muralidharan, P. A. Deymier, S. Pannala, S. Simunovic
International Conference "Scientific Computing to Computational Engineering, 3rd IC-SCCE,
July 2008, Athens, Greece
15. REVERSIBLE AND DIRECTIONAL SELF-ASSEMBLY OF BIO-MOLECULAR TEMPLATES
FOR NANOTECHNOLOGY INTERCONNECTS (**POSTER**)
Michele Pavanello, Krishna Muralidharan
Poster Presentation at 2007 National Science Foundation (NSF) Conference on International
Research and Education in Engineering, Oct 30-Nov 1, 2007, Purdue University, West Lafayette, IN
16. EFFECT OF SOLUTION CHEMISTRY IN MEGASONIC CLEANING
M. Keswani, S. Raghavan, S. Verhaverbeke, Krishna Muralidharan, P. Deymier
Presented at Surface Preparation and Cleaning Symposium SEMATECH, Austin 2007.
17. EXPERIMENTAL AND SIMULATION INVESTIGATIONS OF ACOUSTIC CAVITATION IN
MEGASONIC CLEANING
Krishna Muralidharan, M. Keswani, S. Raghavan, P. Deymier, F. Eschbach, **A. Sengupta**
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18. MULTISCALE MODELING OF FRACTURE IN SiO_2
A. Mallik, Krishna Muralidharan, K. Runge, J. W. Dufty
Presented at South-Eastern Section of the American Physical Society, Nov 9-11, 2005, Gainesville, FL
19. SOFTWARE FOR INTEGRATION OF QUANTUM MECHANICAL AND QUANTUM
REGIONS IN MOLECULAR DYNAMICS
J. Torras, Krishna Muralidharan, E. Deumens, S. B. Trickey
Presented at International Society for Theoretical Chemical Physics, July 20-25, 2005, New Orleans, LA
20. CHOOSING A POTENTIAL FOR MULTISCALE MODELING
A. Mallik, Krishna Muralidharan, K. Runge, J. W. Dufty
Presented at American Physical Society Annual March Meeting, Mar. 21, 2005, Los Angeles, CA
21. PHASE STABILITY OF Pu-Ga ALLOYS FROM FIRST-PRINCIPLES AND MOLECULAR
DYNAMICS CALCULATIONS
M. A. Stan, M. I. Baskes, Shao-Ping Chen, and Krishna Muralidharan
Presented at CALPHAD XXXII International Conference on Phase Diagram Calculations and
Computational Thermochemistry, May 25-30, 2003, La Malbaie, Quebec, Canada
22. PHASE STABILITY IN THE Pu-Ga SYSTEM FROM FIRST PRINCIPLES AND MOLECULAR
DYNAMICS CALCULATIONS
Marius Stan, M. I. Baskes, and Krishna Muralidharan
Presented at 2003 Materials Research Society Fall Meeting, Dec. 1-5, 2003, Boston, MA

COLLOQUIA/SEMINARS

1. EXPERIMENTAL AND THEORETICAL INVESTIGATIONS OF GRAPHENE-FULLERENE BASED
SYSTEMS FOR TECHNOLOGICAL APPLICATIONS,
Krishna Muralidharan, Department of Physics Seminar, IIT Madras, Chennai, December 27th 2016.

2. GRAPHENE AND FULLERENE ADDITIVES FOR ENHANCING PERFORMANCE OF CARBON SUPERCAPACITORS
Krishna Muralidharan, Invited lecture at IEMN, Lille, May 2015
3. GRAPHENE-FULLERENE BASED SYSTEMS FOR TECHNOLOGICAL APPLICATIONS
Krishna Muralidharan, Invited lecture at IEMN, Lille, June 2014
4. A BOTTOM-UP APPROACH TO MULTISCALE MODELING OF MATERIALS
Krishna Muralidharan, Department Seminar, CEEM, University of Arizona, Nov 2013
5. DELIVERY OF WATER AND ORGANICS TO EARLY EARTH: INSIGHTS FROM QUANTUM CHEMISTRY
Krishna Muralidharan, LPLC 2013, Tucson, 08/23/13
6. SMALL SCALE COMPRESSED AIR ENERGY STORAGE SYSTEMS
Krishna Muralidharan, Department Seminar, Materials Science and Engineering, University of Arizona, March 2011
7. MULTISCALE MODELING OF MATERIALS
Krishna Muralidharan, Department Seminar, Applied Math, University of Arizona, Nov 2010
8. NOVEL PHONONIC METAMATERIALS FOR ACOUSTIC AND THERMAL APPLICATIONS
Krishna Muralidharan, SRC Engineering Research Center for Environmentally Benign Semiconductor Manufacturing (ERC) Seminar Series, March 2010
9. ENVIRONMENT DEPENDENT DYNAMIC CHARGE POTENTIALS: APPLICATIONS TO WATER AND SILICA
Krishna Muralidharan, Presented at Quantum Chemistry Laboratory, University of Warsaw, Poland, June, 2007
10. FUNDAMENTAL PROCESSES IN MEGASONIC-IRRADIATED FLUIDS: APPLICATIONS TO CLEANING
Krishna Muralidharan, SRC Engineering Research Center for Environmentally Benign Semiconductor Manufacturing (ERC) Seminar Series, April 2007
11. BRITTLE FRACTURE IN AMORPHOUS SILICA
Krishna Muralidharan, Department Seminar, Quantum Theory Project, University of Florida, Nov 2004
12. ATOMISTIC CHARACTERIZATION OF FAILURE MECHANISMS IN AMORPHOUS SILICA
Krishna Muralidharan, Department Seminar, Department of Physics and Astronomy, University of New Mexico, Jan 2004

GRANTS AND CONTRACTS (FUNDED)

I have received research contracts from different federal agencies as well as funding from industry. The cumulative funding of all the research grants that I have been involved with exceeds \$ 14 million, out of which my direct share is approximately \$ 3 million.

Principal Investigator projects						
agency	Years	Title/Topic	Funding (\$)	Important contributions	Publications/products	Collaborators
NASA	2011-2014	Primordial Differentiation of	240,000	A new hypothesis on the endogenous origin of water	6 papers,	LPL

		the Terrestrial planets/Origin of water and organics on Earth		and organics. Recent discovery of water on other rocky planets concur our findings	5 conf. presentation	
Canon	2011-2013	Metallic Thin Films with Tunable Permittivity/Optical Metamaterials	450,000	The first demonstration of optically tunable metallic devices for hyperspectral applications	3 papers 2 provisional patents 2 conference presentation	ECE, Opt. Sci
NSF	2011-2013	Fabrication and characterization of a 3D Carbon Nanostructure-Mattressene /Carbon nanostructures	150,000	The first demonstration of surface mediated self-assemblies of fullerenes	5 papers 3 conference presentation 1 PhD	Physics, Chem.
Raytheon	2011-2018	Engineering Strength of ZnS /Mechanics of nanocrystalline ceramics	367,000 consolidated over multiple projects	A new modeling paradigm for scale-free modeling of materials	ITAR-protected data, 1 conference presentation	CEEM
REN (UA)	2013-2014	Graphene mediated self-assembled fullerene nanotubes for ultracapacitor applications /Supercapacitor	60,000	First demonstration of fullerene based supercapacitors; high efficiency, low-cost alternatives to graphene based systems	2 papers, 2 conference presentation 2 invention disclosure 1 M.S	
Amazon	2014-2015	Mechanical and fracture properties of ceramics /Computational software	10,000	Parallelizable molecular dynamics software	1 conference presentation	

Co-Principal Investigator projects

DOE	2012-2017	Halide and Oxy-Halide Eutectic Systems for High Performance High Temperature Heat Transfer Fluids/High efficiency thermal fluids for concentrated solar plants	5.5 Million	Identification of salt compositions via computational means to inform experiments	4 papers, 12 conference presentations 1 invention disclosure	AME, CHEE, Mining,
NASA	2013-2016	Asteroidal and Early Solar	480,000	Unequivocally shown that the timescale of	2 paper,	Geosciences

		System Processes: Theoretical, Experimental and Observational Studies of Mineralogical Records in Meteorites/Time scale of planetary formation		hydrous phyllosilicate formation is well within the time-scale of planet formation, disproving previous hypothesis	4 conference presentations	
NASA	2015-2019	Earth in other solar systems: towards forming and discovering planets with biocritical ingredients <i>/Search for new habitable planets</i>	5.7 Million	Important insights into organics incorporation in planetary building blocks	1 paper, 3 conference presentations	Steward, LPL
NIOSH	2014-2019	Innovative Solutions for Heat Management in Hot Underground Mines: Ventilation Research and Capacity Buildings/ Non-toxic thermal coatings for mine-walls derived from waste materials	1.2 Million	Using computational methods, identified structure composition of thermal insulating barriers	3 paper 5 conference presentation	Mining, Public Health
Toyota	2011-2013	Nanophononic Crystals for Thermal Control <i>/Thermal interface materials, phonon metamaterials</i>	213,000	Demonstrated for the first time the presence and role of rotational modes in determining thermal and phonon response of materials	3 papers	
DOE/SFAz/AzRISE	2009-2013	Critical Components of Energy Storage <i>/Compressed-air energy storage (CAES)</i>	1.67 Million	Demonstrated for the first time that CAES can be scaled well for small scale (10 kW) and medium scale (100kW-1MW) applications	3 papers, 4 conference proceedings, 1 technical report, 1 invention disclosure 1 M.S	SIE, CEEM

Partnership University Fund (PUF)	2011-2015	FACE – Advanced Materials for Energy and Optics <i>/new multifunctional materials</i>	155,000	New carbon nanostructures for thermal and optical applications	2 conference presentations	Opt. Sci
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RESEARCH SUPERVISION and MENTORSHIP

Postdoctoral Associates

- Abu Asaduzzaman (2011-2016)
- Slimane Laref (2011-2013)
- Venkateswara Rao Manga (2013-2016)
- Sahila Perananthan (2017-present)
- Ali Abbaspour Tamijani (2017).

Graduate Students

- Pratish Rao (PhD): Dec, 2018 (expected date of graduation)
- Clovis Weisbart (PhD): May, 2018 (expected date of graduation)-joint supervision with Dr. B.G. Potter
- Abduljabar Al-Sayoud (PhD): Dec, 2017 (expected date of graduation)-joint supervision with Dr. Pierre Deymier
- Matthew Rand (M.S): May, 2018 (expected date of graduation)
- Ben Geller (M.S): May, 2018 (expected date of graduation)
- Tony Jefferson Gnanaprakasa (PhD)-graduated in 2015. “Surface engineering and synthesis of graphene and fullerene nanostructures”
- Stefan Bringuier (PhD) –graduated in 2015. “Mechanical properties of symmetric tilt grain boundaries in silicon and silicon carbide: A molecular dynamics study”
- Deepak Sridhar (M.S)-graduated in 2015. “Carbon nanostructures based supercapacitors.”
- Vijayanathan Kasinathan Veerasamy (M.S)-graduated in 2013. “Thermal management in small scale compressed air energy storage systems.”

Capstone Project advisor

- Kurumi Austin (B.S. 2017)
- Josh Vita (B.S 2017)
- Jared Jensen (B.S 2016)
- Mike Dokouzian (B.S 2016)
- Ben Geller (B.S. 2016)
- Wilson Kong (B.S, 2015)
- Steve Kyle Eddy (B.S, 2014)
- Stephen Purdy (B.S, 2012)

Undergraduate Research Mentor (funded via research grants)

- Conor O Neill (B.S. 2018)-expected date of graduation
- Daniel Molina Escalante (B.S. 2018)-expected date of graduation
- Christopher Tang (B.S. 2017)
- Jillian Grass (B.S. 2017)
- Ben Geller (B.S 2016)
- Eric Gabriel (B.S, 2016)
- Tarlton Ferrin (B.S, 2016)
- Matthew Jordan (B.S, 2015)
- Joshua Paul (B.S 2015)

- Sean Athanasios Katsarelis (B.S, 2012)
- Alex Bergdahl (B.S, 2012)
- Christopher Mendoza (B.S, 2013)
- Eric Gabriel (B.S, 2016)
- Tarlton Ferrin (B.S, 2016)
- Dominique Villela (B.S, 2011)
- Ryan Decker (High school student)

Research Experience for Undergraduates (REU) students

- Kathleen Van Atta (2017)
- Yen Do-Thien (2017)
- Daniel Escalante (2016)
- Christian Bartholomew (2015)

DISSERTATION/THESIS COMMITTEE

- Sourav Gur (PhD)
- Dongni Ma (PhD)
- Wei-Jie Huang (PhD)
- Mellia Oana-Jana (PhD)
- David Pham (PhD)
- Mark Lauer (PhD)
- Pierre Yves Guerder (PhD)
- Ozgur Gulbiten (PhD)
- Russell Beal (PhD)
- Rajkumar Govindarajan (PhD)
- Dinesh Thanu (PhD)
- Luke Walker (PhD)
- Sangita Kumari (PhD)
- Jenny Taubert (PhD)
- Darrick M Buban (PhD)
- N. Swintek (PhD)

- Paul Neff (M.S)
- Chrishani Lidamulage (M.S)
- Shanna Tunne (M.S)
- Robert Schultz (M.S)
- Dominique Villela (M.S)
- JJ Prozcka (M.S)
- C. Swanborg (MS)
- S. de Valle (MS)
- J. Long (MS)
- M. Alvarez (MS)