

CURRICULUM VITA

MICHEL W. BARSOUM

PERSONAL

Date of Birth: January 1, 1955
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EDUCATION

Ph.D. MASSACHUSETTS INSTITUTE OF TECHNOLOGY, June 1985
Degree in Ceramics from Department of Materials Science and Engineering

M.Sc. UNIVERSITY OF MISSOURI-ROLLA, ROLLA, MO. June 1980
Degree in Ceramics Engineering, Department of Ceramic Engineering

B.Sc. AMERICAN UNIVERSITY IN CAIRO, CAIRO, EGYPT February 1977
Department of Materials Engineering; Highest honors.

PROFESSIONAL EXPERIENCE

DREXEL UNIVERSITY, Philadelphia, PA. Jan. 2009-present
A. W. Grosvenor Professor, Department of Materials Science and Engineering

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1999-present
Distinguished Professor, Department of Materials Science and Engineering

LINKOPING UNIVERSITY, Linkoping, Sweden Oct. 08-Sept. 11
Visiting Professor, Sabbatical leave

LOS ALAMOS NATIONAL LABORATORY, Los Alamos, NM Oct. 08 – Sept. 09
Wheatly Scholar, Sabbatical Leave

COMMISSARIAT A L'ENERGIE ATOMIQUE, CEA, Saclay France, Summer 2006

UNIVERSITY OF POITIERS, Poitiers, France, Summer 2003
Visiting Professor

MAX-PLANCK INSTITUTE, PML, Stuttgart, Germany Sept. 2000-2001
Sabbatical Leave

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1997-1999
Professor, Department of Materials Engineering

MAX-PLANCK INSTITUTE, FKF, Stuttgart, Germany Sept. 1993-94
Sabbatical Leave

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1985-99
Assistant and Associate Professor, Department of Materials Engineering

AWARDS

ISI's Most Highly Cited Authors List 2009 (<http://isihighlycited.com/>).
Visiting Professor, Linkoping University, Linkoping, Sweden.
A. W. Grosvenor Professor, Department of Materials Science and Engineering, 2009.

Wheatly Scholar, Los Alamos National Laboratory, Los Alamos, NM, October 2008.
2008 Sigma Xi Lecture, MIT, Cambridge, MA, May 2008.
Outstanding Research Award, Department of Materials Science and Engineering, 2008.
University Research/Scholarship Award, Drexel University, 2007 (Inaugural award).
Academician, World Academy of Ceramics, 2006.
Fellow, American Ceramic Society, 2005.
Marquis Who's Who in Science and Engineering, 2005-2006 Edition.
Outstanding Service Award, Department of Materials Science and Engineering, 2006.
Outstanding Teaching Award, Department of Materials Science and Engineering, 2005.
Outstanding Research Award, Department of Materials Science and Engineering, 2003.
Visiting Professorship, U. of Poitiers, Poitiers, France, 2003.
Outstanding Research Award, College of Engineering, Drexel University, 2003.
Research Scholar Award, Drexel University, 2001.
Alexander von Humboldt-Max Planck Society Prize for Senior US Scientists, 2000.
Distinguished Professor, Drexel University, 1999.

TEXTBOOKS

Fundamentals of Ceramics, 2nd Ed., Taylor and Francis, 2003.
Fundamentals of Ceramics, (668 pages, 300 illustrations), McGraw Hill, NY, 1997.

PATENTS:

- 1) M. W. Barsoum, "Methods for Densifying and Strengthening Ceramic-Ceramic Composites by Transient Plastic Phase Processing". Patent # 5,451,365 (1997).
- 2) M. W. Barsoum, D. Brodtkin, T. El-Raghy and G. S. Yaroschuk, "Synthesis of H-phase Products", WO 9727965, Issued in 1997.
- 3) M. W. Barsoum and T. El-Raghy, "Process for Making a Dense Ceramic Work-piece." Patent # 5,882,561. Issued in 1999.
- 4) M. W. Barsoum, T. El-Raghy, D. Brodtkin, A. Zavaliangos and S. Kalidindi, "Synthesis of 312 Compounds and Composites Thereof, Patent # 5,942,455. Issued in 1999.
- 5) M. W. Barsoum and T. El-Raghy, "Surface Modification of 312 and Related Materials", US Patent # 6,013,322. Issued in 2000.
- 6) R. Knight and M. W. Barsoum, "Corrosion, Oxidation, and/or Wear-Resistant Coatings", U.S. Patent No. 6,231,969. Issued May 2001.
- 7) T. El-Raghy, M. W. Barsoum, M. Sundberg and H. Pettersson, "Process for forming 312 phase materials and process for sintering the same", US Patent # 6,461,989.
- 8) M. Sundberg, K. Lindgren, T. El-Raghy and M. W. Barsoum, "Method of producing a metal-containing single-phase composition", US Patent # 6,986,873.
- 9) V. Jovic and M. W. Barsoum, "Electrolytic Cell and Electrodes For Use in Electro-chemical Processes", US Patent 7,001,494. Issued Feb. 2006.
- 10) S. Gupta, M. W. Barsoum, C.-W. Li and T. G. Palanisamy, "Ternary Carbide and Nitride Materials Having Tribological Applications and Methods of Making Same". US Patent 7,553,564 B2. Issued June 2009.
- 11) T. G. Palanisamy, S. Gupta, M. W. Barsoum and C.-W. Li, "Ternary Carbide and Nitride Composites having Tribological Applications and Methods of Making Same". US Patent 7572313 B2, Issued June 2009.
- 12) S. Basu, P. Finkel, A. Zhou and M. W. Barsoum, "A Method for Structural Health Monitoring Using a Smart Sensor System". US Patent 7917311.
- 13) Y. Gogotsi and M. W. Barsoum, "Nanoporous Carbide Derived Carbon, CDC's, with Tunable Pore Size". Japanese Patent No. 4646911.

PENDING

- 14) Y. Gogotsi, G. Yushin, E.N. Hoffman, M. W. Barsoum, "Nanoporous Carbonaceous Membranes and Related Methods", PCT/US2007/011442.

- 15) Y. Gogotsi, G. Yushin, E. N. Hoffman & M.W. Barsoum, "Process for Producing Nanoporous CDCs with Large Specific Surface Area", PCT/US2006/045154.
- 16) M. W. Barsoum, E. N. Hoffman and R. D. Doherty, "Reduction of Spontaneous Metal Whisker Formation". Abandoned.
- 17) A. Moseson, S. Basu and M. W. Barsoum, "A Novel Method for Zero Point Detection". Abandoned.
- 18) S. Amini and M. W. Barsoum, "MAX-Based Metal Matrix Composites". Non-provisional patent filed. 12/477,825.
- 19) M. W. Barsoum, M. Naguib and Y. Gogotsi, "Compositions Comprising Free Standing Two Dimensional Nanocrystals", 61/499,318 filed June 21, 2011.

BOOK CHAPTERS, INVITED AND REVIEW ARTICLES (Highlighted papers are noteworthy)

1. S. Gupta and M. W. Barsoum "On the Tribology of the MAX Phases and Their Composites – A Review", *Wear*, 1878-1894 (2011).
2. M. W. Barsoum and M. Radovic, "The Elastic and Mechanical Properties of the MAX Phases", *Annual Review of Materials Research*, Eds. D. Clarke and M. Ruhle, Vol. 41, 9.1-9.33 (2011).
3. M. W. Barsoum and S. Basu, "Kinking Nonlinear Elastic Solids", *Encyclopedia of Materials: Science and Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, B. Ilschner, E. J. Kramer, S. Mahajan, and P. Veysiere, Elsevier, Oxford, 2010, Pages 1-23.
4. M. W. Barsoum, "The MAX Phases and Their Properties", *Ceramics Science and Technology, Vol. 2: Properties*, Eds. R. Riedel & I.-W. Chen, Wiley-VCH Verlag GmbH & Co., pp. 299-345 (2010).
5. M. W. Barsoum, "Nanolayered Kinking Nonlinear Elastic Solids", *Handbook of Nanomaterials*, Ed. Y. Gogotsi, CRC Press, 2006.
6. M. W. Barsoum "Physical Properties of the MAX Phases", *Encyclopedia of Materials Science & Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, E. J. Kramer, S. Mahajan and P. Veysiere, Elsevier Science, Amsterdam, 2006.
7. M. W. Barsoum and M. Radovic, "Mechanical Properties of the MAX Phases", *Encyclopedia of Materials Science & Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, E. J. Kramer, S. Mahajan and P. Veysiere, Elsevier Science, Amsterdam, 2004.
8. M. W. Barsoum and T. El-Raghy, "The MAX Phases: Unique New Carbide and Nitride Materials", *American Scientist*, **89**, 336-345 (2001).
9. M. W. Barsoum, "The $M_{N+1}AX_N$ Phases: A New Class of Solids: Thermodynamically Stable Nanolaminates", *Progress in Solid State Chemistry*, **28**, 201-281 (2000).
10. M. W. Barsoum, T. El-Raghy and M. Radovic, " Ti_3SiC_2 : A Layered Machinable Ductile Ceramic", *Interceram*, **49**, 226-233 (2000).
11. M. W. Barsoum, A. Zavaliangos, S. Kalidindi, T. El-Raghy and D. Brodtkin, "Transient Plastic Phase Processing of Ceramic-Ceramic Composites", *JOM*, November 1995, p. 52
12. M. W. Barsoum, "Degradation of Ceramics in Alkali Metal Environments", *Science and Technology of Fast Ion Conductors*, Eds. H. Tuller and M. Balkanski, NATO Advanced Study Institute Series. pp. 241-270 (1989).

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- 250 D. Jurgens, C. Brusewitz, H. G. Gehrke, H. Hofsass, M. Nagl, M. Uhrmacher, U. Vetter, J. Mestnik-Filho and M. W. Barsoum, "Radioactive $^{111}In/^{111}Cd$ Probes as Suitable Marker to Study the Local Surrounding at Specific Lattice Sites in Select 211-MAX Phases", Sub. for pub.
249. M. W. Barsoum, T. H. Scabarozi, S. Amini, J. D. Hettinger and S. E. Lofland, "Electrical and Thermal Properties of Cr_2GeC ", Sub. for pub.

248. N. J. Lane, S. I. Simak, A. Mikhaylushkin, I. Abrikosov, L. Hultman and M. W. Barsoum, "A First Principles Study of Dislocations in HCP Metals Through the Investigation of the $(11\bar{2}1)$ Twin Boundary", Sub. for pub.
247. M. Shamma, V. Presser, B. Clausen, D. Brown, O. Yeheskel and M. W. Barsoum, "On the Response of Ti_2SC to Stress Studied by *in situ* Neutron Diffraction and the Elasto-Plastic Self-Consistent Approach", *Scripta Mater.*, **65**, 573-576 (2011).
246. B. Anasori and M. W. Barsoum, "Kinking Non-Linear Elasticity and the Low-Cycle, Ultra-high Stress Fatigue of $LiTaO_3$ Studied by Spherical Nanoindentation", Sub. for pub.
245. V. Presser, M. Naguib, L. Chaput, A. Togo, G. Hug and M. W. Barsoum, "First-Order Raman Scattering of the MAX Phases: Ti_2AlN , $Ti_2AlC_{0.5}N_{0.5}$, Ti_2AlC , $(Ti_{0.5}V_{0.5})_2AlC$, V_2AlC , Ti_3AlC_2 and Ti_3GeC_2 ", *J. Raman Spec.* in press.
244. B. Anasori, K. E. Sickafus, I. O. Usov and M. W. Barsoum, "Spherical Nanoindentation Study and Effects of Ion Irradiation on the Deformation Micromechanisms of $LiTaO_3$ Single Crystals", *J. Appl. Phys.*, **110**, 023516 (2011).
243. M. Naguib, V. Presser, D. Tallman, J. Lu, L. Hultman, Y. Gogotsi and M. W. Barsoum, " On the Topotactic Transformation of Ti_2AlC into a Ti-C-O-F Cubic Phase by Heating in Molten Lithium Fluoride in Air", Sub. for pub.
242. M. Naguib, M. Kurtoglu, V. Presser, J. Lu, J. Niu, M. Heon, L. Hultman, Y. Gogotsi and M. W. Barsoum, "Two Dimensional Nanocrystals Produced by Exfoliation of Ti_3AlC_2 ", *Adv. Mater.* in press.
241. M. Naguib, V. Presser, N. Lane, D. Tallman, Y. Gogotsi, J. Lu, L. Hultman and M. W. Barsoum, "Synthesis of a New Nanocrystalline Titanium Aluminum Fluoride Phase by Reaction of Ti_2AlC with Hydrofluoric Acid", *RSC Advances*, in press.
240. N. J. Lane, S. C. Vogel and M. W. Barsoum, "Temperature-Dependent Crystal Structures of Ti_2AlN and Cr_2GeC As Determined From High Temperature Neutron Diffraction," *J. Amer. Cer. Soc.* in print.
239. S. Basu, O. A. Elshrief, R. Coward and M. W. Barsoum, "Microscale Deformation in Single Crystal Rutile (TiO_2) Under Spherical Nanoindentation", Sub. for pub.
238. X. He, Y. Bai, Y. Chen, C. Zhu, M. Li and M. W. Barsoum, "Phase Stability, Electronic Structure, Compressibility, Elastic and Optical Properties of a Newly Discovered Ti_3SnC_2 : A First-principle Study", *J. Amer. Cer. Soc.* in print.
237. C. B. Spencer, J. M. Córdoba, N. Obando, A. Sakulich, M. Radovic, M. Odén, L. Hultman and M. W. Barsoum, "Processing of Ti_2AlC Matrix Composites Reinforced with Al_2O_3 Fibers", *J. Amer. Cer. Soc.* in print.
236. E. N. Hoffman, D. W. Vinson, R. L. Sindelar, D. J. Tallman, G. Kohse and M. W. Barsoum, "MAX Phase Carbides and Nitrides: Properties for Future Nuclear Power Plant Applications", *J. Nucl. Mater.*, in press.
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234. B. Yang, M. W. Barsoum and R. M. Rethinam, "Nanoscale Continuum Calculation of Basal Dislocation Core Structures in Graphite", Phil. Mag., **91**, 1441-1463 (2011).
233. Y. L. Du, Z.-M. Sun, H. Hashimoto and M. W. Barsoum, "Electron Correlation Effects in the MAX Phase Cr₂AlC From First Principles", J. Appl. Phys., **109**, 063707 (2011).
232. A. J. Moseson, A. Sakulich, D. E. Moseson, K. MacKenzie and M. W. Barsoum, "Chemical Pathways and Origins of Strength in Alkali Activated Cement", Sub. for pub.
231. A. J. Moseson, D. E. Moseson and M. W. Barsoum, "High Volume Fine Aggregate Limestone Alkali-Activated Concrete Developed By Design of Experiment", Sub. for pub.
230. N. J. Lane, P. Eklund, J. Lu, C. B. Spencer, L. Hultman and M. W. Barsoum, "High-temperature Phase Stability of α -Ta₄AlC₃", Mater. Res. Bull., **46**, 1088-1091 (2011).
229. K. J. D. MacKenzie, M. E. Smith, A. Wong, J. V. Hanna and M. W. Barsoum, "Were the Casing Stones of Snefru's Bent Pyramid in Dahshour Cast or Carved? – Multinuclear NMR Evidence", Mater. Lett., **65**, 350-352 (2011).
228. A. Kontsos, T. Loutas, V. Kostopoulos, K. Hazeli, B. Anasori and M. W. Barsoum, "Nanocrystalline Mg-Matrix Composites: Mechanical Behavior Characterization via Acoustic Emission Monitoring", Acta Mater. in print.
227. O. Yeheskel, I. C. Ismail, B. Anasori and M. W. Barsoum, "Mechanical and Elastic Properties of Fine-Grained Polycrystalline Scandia and Erbium as Determined By Indentation Techniques", J. Europ. Cer. Soc., **31**, 1703–1712 (2011).
226. C. B. Spencer, J. Córdoba, N. Obando, M. Radovic, M. Odén, L. Hultman and M. W. Barsoum, "On the Reactivities of Ti₂AlC and Ti₃SiC₂ with SiC Fibers and Powders up to Temperatures of 1550°C", J. Amer. Cer. Soc. **94**, 1737–1743 (2011).
225. A. Mendoza-Galván, M. Rybka, K. Järrendahl, H. Arwin, M. Magnuson, L. Hultman and M. W. Barsoum, "Spectroscopic Ellipsometry Study of the Dielectric Function of Bulk Ti₂AlN, Ti₂AlC, Nb₂AlC, (Ti_{0.5}Nb_{0.5})₂AlC and Ti₃GeC₂ MAX Phases", J. Appl. Phys., **109**, 013530 (2011).

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224. X. He, Y. Bai, C. Zhu, Y. Sun M. Li and M. W. Barsoum, "General Trends in the Structural, Electronic and Elastic Properties of the M₃AlC₂ phases (M = transition metal): A First-principle Study", Comput. Mater. Scien., **49**, 691-698 (2010).
223. N. J. Lane, S. C. Vogel and M. W. Barsoum, "High Temperature Neutron Diffraction and the Temperature-Dependent Crystal Structures of Ti₃SiC₂ and Ti₃GeC₂", Phys. Rev. B, **82**, 174109 (2010).
222. D. Jürgens, M. Uhrmacher, H. Hofsäss, J. Mestnik-Filho and M. W. Barsoum, "Perturbed Angular Correlation Studies of the MAX Phases Ti₂AlN and Cr₂GeC Using Ion Implanted ¹¹¹In as Probe Nuclei", Nucl. Instrum. Meth. Phys. Resear. B, **268**, 2185-2188 (2010).

221. E. Jud, S. Miller, A. R. Sakulich, K. MacKenzie and M. W. Barsoum, "Pozzolanic Activity of Diatomaceous Earth", *J. Amer. Cer. Soc.*, **93**, [10] 3406-3410 (2010).
220. S. Miller, A. Sakulich, M. W. Barsoum and E. Jud, "Use of Diatomaceous Earth as a Pozzolon in the Formation of an Alkali Activated Fine-Aggregate Limestone Concrete", *J. Amer. Cer. Soc.*, **93**, 2828-2836 (2010).
219. A. R. Sakulich, S. Miller and M. W. Barsoum, "Chemical and Microstructural Characterization of 20-Month Old Alkali Activated Slag Cements", *J. Amer. Cer. Soc.*, **93**, 1741-1748 (2010).
218. B. Manoun, S. Kulkarni, N. Pathak, S. K. Saxena, S. Amini and M. W. Barsoum, "Bulk Moduli of Cr_2GaC and Ti_2GaN up 50 GPa", *J. Alloy Comps.*, **505**, 328-331 (2010).
217. I. C. Albayrak, S. Basu, A. Sakulich, O. Yehekel and M. W. Barsoum, "On the Elastic and Mechanical Properties of Polycrystalline Transparent Yttria as Determined By Indentation Techniques", *J. Amer. Cer. Soc.*, **93**, 2028-2034 (2010).
216. A. Zhou, D. Brown, S. Vogel, O. Yehekel and M. W. Barsoum, "On the Kinking Nonlinear Elastic Deformation of Polycrystalline Cobalt", *Mater. Sci. Engin. A*, **527**, 4664-4673 (2010).
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213. A. G. Zhou and M. W. Barsoum, "Kinking Nonlinear Elastic Deformation of Ti_3AlC_2 , Ti_2AlC , $\text{Ti}_3\text{Al}(\text{C}_{0.5}\text{N}_{0.5})_2$ and $\text{Ti}_2\text{Al}(\text{C}_{0.5}\text{N}_{0.5})$ ", *J. Alloys Comps.*, **498**, 62-67 (2010).
212. A. R. Sakulich, E. Anderson, C. Schauer and M. W. Barsoum, "Influence of Si:Al Ratio on the Microstructural and Mechanical Properties of a Fine-Limestone Aggregate Alkali-Activated Slag Concrete", *Materials Structures*, **43**, 1025–1035 (2010).
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209. T. H. Scabarozzi, S. Amini, O. Leaffer, A. Ganguly, S. Gupta, W. Tambussi, S. Clipper, J.E. Spanier, M.W. Barsoum, J.D. Hettinger, S.E. Lofland, "Thermal Expansion of Select MAX Phases Measured by High Temperature X-ray Diffraction and Dilatometry", *J. Appl. Phys.*, **105**, 013543 (2009).
208. B. Manoun, O. Leaffer, S. Gupta, E. N. Hoffman, S. K. Saxena, J. Spanier and M. W. Barsoum, "On the Compression Behavior of Ti_2InC , $(\text{Ti}_{0.5}\text{Zr}_{0.5})_2\text{InC}$, and M_2SnC ($\text{M} = \text{Ti}, \text{Nb}, \text{Hf}$) to Quasi-Hydrostatic Pressures Above 50 GPa", *Solid State Comm.* **149**, 1978, (2009).
207. Y. L. Du, Z.-M. Sun, H. Hashimoto and M. W. Barsoum "Theoretical Investigations on the Elastic and Thermodynamic Properties of $\text{Ti}_2\text{AlC}_{0.5}\text{N}_{0.5}$ Solid Solution", *Phys. Lett. A*, **374** 78–82 (2009).

206. S. Amini, J. M. Córdoba Gallego, L. Daemen, A. R. McGhie, C. Ni, M. Odén, L. Hultman and M. W. Barsoum, “On the Stability of Mg Nanograins to Coarsening after Repeated Melting”, *Nano Letters*, **9**, 3082–3086 (2009).
205. S. R. Kulkarni, M. Merlini, N. Phatak, S. K. Saxena, G. Artioli, S. Amini and M. W. Barsoum, “Thermal Expansion and Stability of Ti₂SC in Air and Inert Atmospheres”, *J. Alloy Compnds.*, **469**, 395-400 (2009).
204. T. H. Scabarozi, C. Gennaoui, J. Roche, T. Flemming, K. Wittenberger, P. Hann, B. Adamsom, A. Rosenfeld, M. W. Barsoum, J. D. Hettinger and S. E. Lofland, “Combinatorial Investigation of (Ti_{1-x}Nb_x)₂AlC”, *Appl. Phys. Lett.*, **95**, 101907 (2009).
203. P. Finkel, A. G. Zhou, S. Basu, O. Yeheskel and M. W. Barsoum, “Direct Observation of Nonlinear Acousto-Elastic Hysteresis in Kinking Nonlinear Elastic Solids,” *Appl. Phys. Lett.*, **94**, 241904 (2009).
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200. T. H. Scabarozi, J. Roche, A. Rosenfeld, S. H. Lim, L. Salamanca-Riba, I. Takeuchi, M. W. Barsoum, J. D. Hettinger, S. E. Lofland, “Synthesis and Characterization of Nb₂AlC Thin Films”, *Thin Solid Films*, **517**, 2920-2933 (2009).
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27. A. Kontsos, K. Hazeli, M. W. Barsoum, B. Anasori, T. Loutas, G. Sotiriadis and V. Kostopoulos "Grain Size Effect on the Fatigue Response of Nanocrystalline Mg Composites Reinforced with MAX Phases", 9th HSTAM Intern. Cong. on Mechanics-Limassol, Cyprus, July 2010; Eds. P. Papanastasiou et al., pp 603-610.

28. P. Finkel, A. G. Zhou, S. Basu, O. Yeheskel & M. W. Barsoum, "On the Observation of Acoustic-Elastic Hysteresis in Kinking Non-linear Elastic Solids", AIP Conf. Proc. Vol. **1096**, pp. 231-237, 2009.
29. B. Anasori, S. Amini, V. Presser and M. W. Barsoum, "Nanocrystalline Mg-Matrix Composites with Ultrahigh Damping Properties", **Magnesium Tech. 2011**, Eds: W. H. Sillekens, S. R. Agnew, N. R. Neelameggham and S. N. Mathaudhu TMS, The Minerals, Metals & Materials Society, (2011) pp. 463-468.

MONOGRAPHS

M. J. Koczak, K. Prewo, A. Mortensen, S. Fishman, M. W. Barsoum & R. Gottschall, "Inorganic Composite Materials in Japan: Status and Trends", ONR Research Scientific Bull., Nov. 1989.

PRESENTATIONS

Invited Talks: (Highlighted talks are noteworthy).

157. Haldor Topsøe, Copenhagen, Denmark, March 2011; MAX phase talk
156. Society of Danish Chemical Engineers, Copenhagen, Denmark, March 2011; pyramid talk
155. Linköping University, Linköping, Sweden, MAX phase derivatives.
154. Loyola University, Baltimore, MD, Feb. 2011, Pyramid talk
153. General Electric, Schenectady, NY. December, 2010; MAX phase talk.
152. **Plenary lecture:** 7th Inter. Conf. on High Temp. Ceram. Matrix Comp., Bayreuth, Germany, Sept. 2010. MAX phases talk.
151. Paul Scherrer Institute, Zurich, Switzerland, July 2010; MAX/KNE talk.
150. EMPA, Thun, Switzerland, July 2010; MAX/KNE/NI talk.
149. CIMTEC, Montecatini, Italy, June, 2010. MAX/KNE talk.
148. **Keynote lecture:** 1st Intern. Conf. on Materials for Energy 2010, Karlsruhe, Germany, July 2010. MAX phase talk.
147. Harbin Institute of Technology, Harbin, China, May 2010; Mech. props. of MAX phases.
146. Harbin Institute of Technology, Harbin, China, May 2010; Physical props. of MAX phases.
145. ASM Brandywine Chapter, April 2010, Brandywine PA; Pyramid talk.
144. CAMTEC II, Cambridge, England, March 2010; NI/KNE talk.
143. 34th ICACC in Daytona Beach, FL, January 2010; MAX phase talk
142. 34th ICACC in Daytona Beach, FL, January 2010; Pyramid Talk
141. Science Café, Santa Fe Alliance for Science, Santa Fe, NM; Pyramid talk.
140. Washington University, St. Louis, Mo, November, 2009; Pyramid talk.
139. Lake Louise Conference, Lake Louise, Canada, Oct. 2009; Pyramid talk
138. Lake Louise Conference, Lake Louise, Canada, Oct. 2009; MAX talk
137. TM&S Fall Meeting, Pittsburgh, PA, Oct. 2009; MAX talk.
136. Right Angle Club, Philadelphia, PA, Oct. 2009, Pyramid talk.
135. Florida Institute of Technology, Melbourne, Fl, Oct. 2009, Pyramid talk.
134. MS&T'09 Fall Meeting, Pittsburgh, Oct. 2009, MAX talk.
133. Aachen University, Aachen, Germany; Sept. 2009, MAX/KNE talk
132. Los Alamos National Lab, Los Alamos, NM, June 2009; Pyramid talk.
131. Amer. Cer. Soc. PACRIM8 Meeting, June 2009, Vancouver, Canada; Pyramid talk.
130. Uppsala Univ., Uppsala, Sweden, May 2009; MAX/KNE talk.
129. Uppsala Univ., Uppsala, Sweden, May 2009; Pyramid talk.
128. Inter. Conf. on Metall. Coating & Thin Films. San Diego, CA, April 2009; MAX/KNE talk.
127. Los Alamos National Lab, Los Alamos, NM, March 2009; Pyramid talk.
126. Los Alamos National Lab., Los Alamos, NM, Feb. 2009; Pyramid talk.
125. Linköping University, Linköping, November, Nov. 2008. Pyramid talk.
124. Linköping University, Linköping, November, Nov. 2008. MAX talk.

123. Anna Maria Workshop IX, Anna Maria Island, Nov. 2008. Pyramid talk.
122. Anna Maria Workshop IX, Anna Maria Island, Nov. 2008. Alternative cement talk.
121. MS&T, Pittsburgh, PA, Oct. 2008. Pyramid talk.
120. MS&T, Pittsburgh, PA, Oct. 2008. Spherical Nanoindentation Stress-Strain Curves, Kinking Nonlinear Elastic Solids and Low Dimensionality Solids.
119. E-MRS Fall Meeting, Warsaw, Poland, Sept. 2008. MAX/KNE talk.
118. Special Workshop: "Radiation Stability of Complex Microstructures"; Santa Fe, NM, Sept. 2008, Compression creep of ceramics and MAX phases.
117. Rutgers University, New Brunswick, NJ, Sept. 2008. Pyramid Talk
116. Director's Colloquium, Savannah River National Lab., Aiken, SC, May 2008; Pyramid Talk.
115. 2008 Sigma Xi Lecture, MIT, Cambridge, MA, May 2008; Pyramid talk.
114. NIST, Gaithersburg, MD. April 2008, Pyramid talk.
113. ASM Liberty Bell Chapter, Sustaining Members Night, April 2008; Pyramid talk.
112. Dupont Experimental Station, Delaware, March 2008; MAX/KNE talk.
111. 13th Israeli Materials Engineering Conference, December 2007; Pyramid talk.
110. Plenary Lecture, 13th Israeli Materials Engineering Conference, Dec. 2007; MAX/KNE talk.
109. MRS Fall 2007 Meeting, Boston, MA, Nov. 26-28, 2007, Symposium Y; Pyramid talk.
108. Center for Talented Youth, Johns Hopkins Univ., 2007 Science and Technology Series, Family Academic Programs, Oct. 2007. Pyramid Talk.
107. Gordon Research Conf., High Temperature Corrosion; New London, NH; August 2007. Oxid. of MAX phases.
106. Los Alamos National Lab., Los Alamos, NM, April 2007; MAX talk.
105. Laval University, Quebec City, Canada, May 2007, Pyramid talk.
104. International Cement Microscopy Assoc. Conf., Quebec City, Canada, May 2007, Open debate on whether cast blocks were used in construction of the Pyramids of Egypt.
103. 6th Adv. Workshop on Engin. Ceram., Smolenice Castle, Slovakia, May 2007; KNE talk
102. 6th Adv. Workshop on Engin. Ceram., Smolenice Castle, Slovakia, May 2007; Pyramid talk
101. Los Alamos National Lab., Los Alamos, NM, April 2007; Nanoindentation talk.
100. Los Alamos National Lab., Los Alamos, NM, April 2007; KNE Talk
99. Los Alamos National Laboratory, Los Alamos, NM, April 2007; Pyramid Talk
98. Texas A&M, College Station, TX, March 2007; Pyramid talk
97. Texas A&M, College Station, TX, March 2007; Kinking Nonlinear Elastic Solids talk.
96. International Center of Diffraction Data, Newtown Square, PA March 2007; Pyramid talk.
95. Keynote speaker, National Consortium of Specialized Secondary Schools of Math, Science, and Technology, Drexel University, March 2007. Pyramid Talk.
94. Johns Hopkins University, Baltimore, MD, March 2007. Kinking Nonlin. Elastic Solids Talk
93. Drexel University, Engineering New Frontiers Lecture, February 2007. Pyramid Talk
92. Columbia University, Geology Department, New York, January 2007. Pyramid Talk
91. MS&T Fall 2006 Meeting, Cincinnati, OH (two different invited talks).
90. Frontiers in Materials Research Workshop, Center for Advanced Interdisciplinary Research, Vina del Mar, Chile, Oct. 2006.
89. University of Gottingen, Gottingen, Germany, July 2006.
88. CIMTEC, Italy, June 2006.
87. Oak Ridge National Laboratory, Oak Ridge, TN, April 21, 2006. Pyramid Talk.
86. Oak Ridge National Laboratory, Oak Ridge, TN, April 19, 2006.
85. Drexel University, Department of Materials Science and Engineering, April 2006.
84. CEA, Saclay, France, March 2006.
83. AVS International Symposium, Boston, USA, October 30th to November 4th, 2005.
82. ONERA, Paris, September 2005.
81. SMEC Conf., Florida International University, Miami, FL, April 2005.
80. Caterpillar, Technology & Solutions Division, Peoria, IL, January, 2005
79. 29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL

78. NIST, Gaithersburg, MD, December 2004.
77. IBM, Poughkeepsie, New York, December 2004.
76. DOE Workshop on Ceramics Ductilization, Santa Fe, NM, November 2004.
75. Abardeen Proving Grounds, ARL, Abardeen, MD, October 2004.
74. CNRS/Ecole Centrale de Lyon, Lyon, France, September 18, 2004.
73. CNRS/Ecole Centrale de Lyon, Lyon, France, September 16, 2004.
72. University of Grenoble, Grenoble, France, September 14, 2004.
71. Polish Academy of Sciences, Wroclaw, Poland, May 2004.
70. Uppsala University, Uppsala, Sweden, May 2004, MAX phases
69. Virginia Tech. University, Blacksburg, VA, March 2004, MAX phases.
68. Seoul National University, Seoul, S. Korea, Oct. 2003.
67. 1st International Symposium on Nanostructured Materials, Seoul, S. Korea, Oct. 2003.
66. University of Poitiers, Poitiers, France, July 2003, MAX phases
65. Rutgers University, New Brunswick, March 2003, MAX phases
64. Oak Ridge National Laboratory, Oak Ridge, TN, Feb. 2003
63. ONERA, Paris, France, June 2002
62. University of Poitiers, Poitiers, France, June 2002
61. CNRS/Ecole Centrale de Lyon, Lyon, France, June, 2002.
60. GE Aircraft Engines, Cincinnati, OH May 2002.
59. University of Missouri-Rolla, Rolla, MO, April. 2002.
58. AIST, Sendai, Japan, March, 2002
57. Tohoku University, Sendai, Japan, March 2002
56. Cerratec Inc., Sendai, Japan, March, 2002
55. Drexel University, Phila., PA, Feb. 2002.
54. U. of Pennsylvania, Phila. PA. Oct. 2001.
53. U. of Maryland, College Park, MD, Sept. 2001, MAX phases.
52. Naval Research Lab., Wash. DC., Sept. 2001, MAX phases
51. Technische Univ. Clausthal, Clausthal, Germany, June 2001.
50. U. of Hamburg, Hamburg, Germany, June 2001.
49. U. of Ulm, Ulm, Germany, May 2001.
48. AEA Technology, Oxford, England, April 2001.
47. Uppsala Univ., Uppsala, Sweden, Workshop on Experimental and Theoretical Studies of Designer Materials, April 2001.
46. Oxford University, Oxford, England, April 2001.
45. U. of Karlsruhe, Karlsruhe, Germany, March 2001, MAX phases
44. Federal Instit. of Tech., Lausanne, Switzerland, Feb. 2001
Technical Univ. of Eindhoven, Netherland, Feb. 2001
43. U. of Groningen, Holland, Feb. 2001
42. Max-Planck Institute, Stuttgart, Germany, Dec. 2000.
41. ABB Corp., Sweden, Dec. 2000.
40. Uppsala University, Sweden, Dec. 2000, MAX phases
39. Linkoping University, Sweden, Dec. 2000. MAX phases
38. Hilti Corp., Lichtenstein, Dec. 2000.
37. Chalmers University of Tech., Sweden, Dec. 2000, MAX phases
36. Kanthal Corp., Sweden, Dec. 2000, MAX phases
35. Univ. of Vienna, Austria, Nov. 2000, MAX phases
34. Ecole Centrale de Lyon, France, Nov. 2000.
33. Polytech. Institut. Milano, Italy, Nov. 2000.
32. El-Tech Corp., Cleveland, OH, July 2000.
31. Brush-Wellman, Cleveland, OH, Feb. 2000.
30. University of Illinois-Chicago, Chicago, IL, April 2000.
29. Praxair, Indianapolis IN, Oct. 1999.

28. Black and Decker, Towson, MD, Oct. 1999.
27. Oak Ridge National Lab., Oak Ridge, TN, Oct. 1998.
26. TMS Fall Meeting, Chicago, Ill, Oct. 1998.
25. AMP Incorporated, Harrisburg, PA, June 1998.
24. University of Illinois, Urbana, Ill, April 1998.
23. Symposium on "Innovative Processing and Synthesis of Ceramics, Glasses, and Composites", 100th Annual Meeting of the American Ceramic Society in Cincinnati, OH, May 3-6, 1998.
22. Vesuvius Research Pittsburgh, PA, Feb. 1998.
21. ALCOA Tech. Center, Pittsburgh, PA, Feb. 1998.
20. National Institute for Standards and Technology, Gaithersburg, MD. September 1997.
19. Cabot Corporation, Boyertown, PA, Sept. 1996.
18. Wright-Patterson AFB, Dayton, OH, July 1996.
17. M. W. Kellogg, Houston, TX, July 1996.
16. ART, Buffalo, NY, May 1996.
15. University Of Penn, Phila., PA, May 1996.
14. Norton-Saint Gobain, Northboro, MA, April 1996.
13. Drexel University, Phila, PA, Feb. 1996.
12. GE Corporate Research and Development, Schenectady, N.Y., January 1996.
11. Max-Planck Institute Pulver Metallurgisches Laboratorium, Stuttgart, Germany, "Role of Silicon Oxynitride During Nitridation of Si Powders in Nitrogen, June 1994.
10. Max-Planck Institute Fur Festkorperforschung, Stuttgart, Germany, "Reduction Kinetics and Electrical Conductivity in Lead-Disilicate Based Glasses", May 1994.
9. NASA-Lewis Research Center, Cleveland, OH, "Fiber-Reinforced Ceramic Matrix Composites", February 1993.
8. Penn State, State College, Department of Materials Science and Engineering, "Transient Plastic Phase Processing of Ceramics", February 1993.
7. Purdue University, Lafayette, In., Department of Materials Engineering, "Transient Plastic Phase Processing of Ceramic Composites", November 1992.
6. Princeton University Plasma Physics Lab. Lecture Series, "Sun Dragon: The Making of a Solar Car", January 1992, Princeton, NJ
5. TMS Fall Meeting, "In-situ Processing of Ceramic/Ceramic Composites by Solid/Solid Reactions", October 8-11, 1991, Cincinnati, Ohio.
4. American Chemical Society (Education Division), "Glass Matrix Composites: Processing and Properties", August 1990, Wash., D.C.
3. Rutgers University, Piscataway, NJ, "Fiber-Reinforced Ceramics: Theory vs. Expt.", Oct. 1989.
2. Tokyo Institute of Technology, Tokyo, Japan, Sept. 1988, "Matrix Cracking in Uniaxially Reinforced Ceramic Matrix Composites".
1. NATO Advanced Study Institute on the Science and Technology of Fast Ion Conductors, Erice, Italy July 1-15, 1987, "Degradation of Ceramics in Alkali Metal Environments".

Presentations and Posters: (person presenting is in bold letters)

MS&T, Fall 2009 Meeting, Pittsburgh, PA. Direct Observation of Acousto-Elastic Hysteresis in Kinking Nonlinear Elastic Solids: **P. Finkel**, O. Yeheskel, M. W. Barsoum

MS&T, Fall 2009 Meeting, Pittsburgh, PA. Electronic, Elastic and Thermal Properties of Ti_2AlC , Ti_3AlC_2 , $Ti_3Al(C_{0.5}N_{0.5})_2$, $Ti_2Al(C_{0.5}N_{0.5})$ and Ti_2AlN : *T. Scabarozzi*, *M. Radovic*, *B. Manoun*, *J. Hettinger*, *S. Lofland*, *S. Amini*, *P. Finkel*, & **M. W. Barsoum**.

MS&T, Fall 2009 Meeting, Pittsburgh, PA. "Thermal Stability and Effect of Texture on Ultrahigh Damping of Nanocrystalline Mg-Matrix Composites Reinforced with MAX Phases" *S. Amini*, *M. W. Barsoum*, *A. R. McGhie*, *C. Ni*, *M. Odén*, *S. Vogel* and *D. Brown*.

MS&T, Fall 2009 Meeting, Pittsburgh, PA "Mechanical Properties and Kinking Non-Linear Elasticity of Fully Dense Ti_2SC and Cr_2GeC ", S. Amini and **M. W. Barsoum**

MS&T, Fall 2009 Meeting, Pittsburgh, PA "Thermal Expansion of Select MAX Phases Measured by High Temperature X-ray Diffraction and Dilatometry", T. Scabarozzi, S. Amini, O. Leaffer, A. Ganguly, S. Gupta, W. Tambussi, S Clipper, J. Spanier and M. W. Barsoum.

MS&T, Fall 2009 Meeting, Pittsburgh, PA, Electron-Backscattered Diffraction and Transmission Electron Microscopy Microstructural Study of Post-Crept Ti_3SiC_2 : F. Barcelo, S. Doriot, T. Cozzika, M. Le Flem, J. Béchade, **M. Radovic**; M. W. Barsoum.

MS&T, Fall 2009 Meeting, Pittsburgh, PA, **The MAX Phases and Kinking Non-Linear Elastic Solids a Newly Identified Class of Solids: M. W. Barsoum**

MS&T, Fall 2009 Meeting, Pittsburgh, PA, Reactivity of Ti_2AlC with SiC Fibers and Powders up to Temperatures of $1550^\circ C$, C. Spencer, J. Córdoba, E. Judd-Sierra, N. Obando, **M. Radovic**, M. Odén, L. Hultman, and M. W. Barsoum.

MS&T, Fall 2009 Meeting, Pittsburgh, PA, On the Reactivity of Ti_2AlC with Al_2O_3 Fibers, C. Spencer, J. Córdoba, N. Obando, **M. Radovic**, M. Odén, L. Hultman and M. W. Barsoum

On The Spherical Nanoindentation Stress-Strain Curves, Effective Zero Point, And Their Applications, **S. Basu**, A. Moseson and M. W. Barsoum, Workshop on in-situ methods in nanomechanics, Lawrence Berkeley National Laboratory, Aug. 2007, Berkeley, CA. **Poster**

On The Determination Of Spherical Nanoindentation Stress-Strain Curves, Surface Zero Point, And Their Applications, S. Basu, A. Moseson & M. W. Barsoum, MRS Fall Meet., Nov. 2007, Boston, MA. **Poster**

Spherical Nanoindentation Stress-Strain Analysis and Applications, **S. Basu** and M. W. Barsoum, Frontiers in Mechanical Engineering 2008: Nanomechanical Engineering, University of Pennsylvania, May 2008, Philadelphia, PA. **Poster**.

107th Annual Meeting American Ceramic Society, April, 2005, Baltimore, MD, "Joining of $M_{n+1}AX_n$ Phases at Elevated Temperatures", **A. Ganguly**, M. W. Barsoum and R. D. Doherty.

107th Annual Meeting American Cer. Soc., April, 2005, Baltimore, MD, "Low Temp. Elastic and Electronic Properties of $Ti_3Si_{1-x}(Ge/Al)_xC_2$ and $Ti_2AlC_yN_{(1-y)}$ Solid Solutions", **A. Ganguly**, M. W. Barsoum, P. Finkel, J. Hettinger, S. Lofland, K. Harrell, Z. Sun, S. Ali & R. Ahuja.

107th Annual Meeting of the American Ceramic Society, Apr. 10-13, 2005, Baltimore, MD, "Theory of Kinking Nonlinear Elastic Solids", **A. Zhou**, M. W. Barsoum, T. Zhen, Z. M. Sun, S. R. Kalidindi

ECS: 207th Meeting "Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes", Oral Pres. **J. Chmiola**, G. Yushin, R. Dash, E. Hoffman, J. Fischer, M. W. Barsoum and Y. Gogotsi.

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, "Tribological Properties of MAX phase", with **S. Gupta**, Z. M. Sun, A. Ganguly, T. Palanisamy, E. Passman & C. W. Li

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, Synthesis and Consolidation of Single-Phase Ternary Compound Ti_3SiC_2 via Pulse Discharge Sintering (PDS), with **Z. M. Sun**, M. W. Barsoum, H. Hashimoto, and Z. F. Zhang. (Poster).

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, “Mechanical and Damping Properties of Porous Ti_3SiC_2 ”, with **Z. M. Sun**, A. Zhou, T. Zhen, A. Murugaiah, M. W. Barsoum and T. El-Raghy.

29th Inter. Conf. on Advanced Ceramics and Composites, Amer. Ceram. Soc., Jan 23-28, 2005, Cocoa Beach, FL, “Nanoindentations in Ceramic Single Crystals”, **S. Basu**, A. Murugaiah, Z. Sun, S. R. Kalidindi and M. W. Barsoum.

29th Inter. Conf. on Advanced Ceramics and Composites, Ceramic Society, Jan 23-28, 2005, Cocoa Beach, FL, “Nanoindentations in Sapphire Single Crystals”, **S. Basu**, A. Murugaiah, Z. Sun, S. R. Kalidindi and M. W. Barsoum.

MRS Meeting Fall 2004, “First Order Raman Scattering from MAX Phases”, Oral Presentation: **J. S. Spanier**, S. Gupta and M. W. Barsoum.

MRS Meeting Fall 2004, “Effect of Al additions on the synthesis of single-phase Ti_3SiC_2 ” Poster with **Z. M. Sun**, S. L. Yang, H. Hashimoto and M. W. Barsoum

MRS Meeting Fall 2004, "Growth Model and Observations of Soft Metal Whiskers", Oral Presentation : **E. N. Hoffman**, M. W. Barsoum, R. D. Doherty, and A. Zavaliangos.

MRS Meeting Fall 2004, “Ductile Machinable Ternary Carbides and Nitrides: A New Class of Solids”, M. W. Barsoum.

MRS Meeting Fall 2004, "Tribological and Wear Studies of MAX Phases and Its Composites", Oral Presentation: **S. Gupta**, Z. M. Sun, M. W. Barsoum, T. Palanisamy, E. Passman and C. W. Li.

MRS Meeting Fall 2004, “Kinking Nonlinear Elastic Solids & Spherical Nanoindentations”, Oral Presentation, **M. W. Barsoum**, A. Murugaiah, T. Zhen, S. Basu and S. R. Kalidindi.

MRS Meeting Fall 2004, “Spherical Nanoindentations in Mica, Graphite and Sapphire”, Oral Presentation: **S. Basu**, A. Murugaiah, M. W. Barsoum, Z. M. Sun, S. R. Kalidindi and Y. Gogotsi.

ECS, 203rd Meeting, Paris, France. “Synthesis and Oxidation of Cr_2AlC and V_2AlC in Air”, by S. Gupta and **M. W. Barsoum**,

ECS, 203rd Meeting, Paris, France. “Oxidation of $Ti_{n+1}AlX_n$ where $n = 1-3$ and X is C and/or N”, by **M. W. Barsoum**, N. Tzenov, A. Procopio, T. El-Raghy and M. Ali

ECS, 203rd Meeting, Paris, France. “Long Time Oxidation Study Of Ti_3SiC_2 , Ti_3SiC_2/SiC and Ti_3SiC_2/TiC Composites in Air, by **M. W. Barsoum**, L. H. Ho-Duc, M. Radovic and T. El-Raghy.

ACers, 105th Annual Meeting, Nashville, TN, “Nanoindentation of a Natural Nanolaminate Material: Ti_3SiC_2 ”, by **A. Murugaiah**, M. W. Barsoum, S. R. Kalidindi, T. Zhen and Y. Gogotsi.

ACers, 105th Annual Meeting, Nashville, TN, “Synthesis and Oxidation Kinetics of Cr_2AlC in Air”, by **S. Gupta** and M. W. Barsoum.

ACers, 105th Annual Meeting, Nashville, TN, “Synthesis and Oxidation kinetics of V_2AlC and $(Ti,V)_2AlC$ in Air”, by **S. Gupta** and M. W. Barsoum.

ACers, 105th Annual Meeting, Nashville, TN, “The 1300 °C Isothermal Sections in the Nb-Sn-C and Ti-In-C Ternary Phase Diagrams”, by **A. Ganguly**, M. Barsoum and F. Aldinger.

ACers, 105th Annual Meeting, Nashville, TN, “Nanolaminates, Kink Bands and Fully Reversible Dislocation-Based Deformation Up to 1 GPa in Ti₃SiC₂”, by **T. Zhen**, M. W. Barsoum, S. Kalidindi, M. Radovic and A. Murugaiah

MRS Meeting Spring 2003, “Fully Reversible Dislocation-Based Deformation in a Nanolayered Carbide: Ti₃SiC₂”, by **M. Barsoum**, T. Zhen, S. Kalidindi and A. Murugaiah.

MRS Meeting Spring 2003, “Deformation Processes During Nanoindentation of Ti₃SiC₂”, Poster with A. Murugaiah, **M. W. Barsoum**, S. Kalidindi, and T. Zhen.

MRS Meeting Spring 2003, “Dual Tribological Behavior of a Nanolayered Ceramic: Ti₃SiC₂”, Poster with **A. Souchet**, J. Fontaine, M. Belin, T. Le Mogne, J-L. Loubet and M. W. Barsoum.

SMEC Conf., Florida International University, March 2003, Miami, FL, “Nanoindentation of A Natural Nanolaminate: Ti₃SiC₂ M. W. Barsoum, A. Murugaiah, S. R. Kalidindi, T. Zhen and Y. Gogotsi.

APS March Meeting, Texas, 2003. “Low Temperature Transport Properties of the Natural Nanolaminates: Ti₃AlC₂ and Ti₄AlN₃”, with P. **Finkel**, J.D. Hettinger, S.E. Lofland.

APS March Meeting, Texas, 2003, “Low Temperature Electrical and Thermal Transport Properties of the Natural Nanolaminate V₂AlC”. With J. D. Hettinger, P. **Finkel**, S. E. Lofland and S. Gupta.

Gordon Research Conference, Aug. 2001, “Deformation and Rupture of Ti₃SiC₂ During Tensile Creep in the 1000-1200°C Temperature Range”, Poster with **M. Radovic**, T. El-Raghy and S. Wiederhorn

23rd Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Compression Creep Behavior of Ti₃SiC₂ in the 1000-1200 °C Temperature Range” with **T. El-Raghy**, B. Tiberio, A. Zavaliangos.

Centennial Meeting of APS, March 20-26, Atlanta GA, “Temperature Dependence of the Elastic Properties of Ti₃SiC₂”, Bulletin of American Physical Society, **44**, No.2, 1999, with **P. Finkel** and T. El-Raghy.

23rd Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Thermal Properties of Ti₃SiC₂”, with T. El-Raghy, C. Rawn, A. Payzant and C. Hubbard.

23rd Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Room Temperature Ductile Carbides”, with T. El-Raghy

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, “Effect of Micro-structure on Room and Elevated Temperature Mechanical Properties of Ti₃SiC₂” with T. El-Raghy. C-005-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, “Surface Treatment of Ti₃SiC₂”, with T. El-Raghy. C-006-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, "Oxidation of Ti₃SiC₂ in Air", with T. El-Raghy and L. Ogbuji. C-007-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, "Polycrystalline Nanolaminates", with T. El-Raghy. C-008-97.

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL, "Polycrystalline Nanolaminates, Ti_3SiC_2 , Ti_3GeC_2 & the H-phases", with T. El-Raghy

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL, "Reaction Path and Microstructure-Property Relationships in Ti_3SiC_2 ", with T. El-Raghy

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL, "Functionally Graded Ti_3SiC_2 Materials", with T. El-Raghy

1996 MRS Fall Meeting, Dec. 2-6, Boston, MA, "Polycrystalline Nanolaminates, Ti_3SiC_2 , Ti_3GeC_2 & the H-phases", with T. El-Raghy. V10.10

1996 MRS Fall Meeting, Dec. 2-6, 1996, Boston, MA, "Effect of Interplanar Debonding on the Properties of Ti_3SiC_2 and the H-phases", with T. El-Raghy. W12.10

98th Annual Meeting of the Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, " Ti_3SiC_2 & Other Truly Remarkable Ceramics", with T. El-Raghy.

98th Annual Meeting of the Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, "Transient Plastic Phase Processing of Ceramic/Ceramic Composites and their Properties", with A. Zavaliangos, S. Kalidindi and D. Brodtkin

98th Annual Meeting of Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, "Processing of Fully Dense Single Phase Ti_3SiC_2 and Ti_3SiC_2 -TiC Composites", with T. El-Raghy.

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN, "A Novel Technique to Measure Axial Thermal Residual Strains and Critical Lengths of Ceramic Fibers and Whiskers", with A. Elkind. SII-78-93.

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN., "Transient Plastic Phase Processing of Ultra-Refractory Composites".

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN., "Role of Oxynitride Formation During Nitridation of Si Powders in Nitrogen", with T. Parker. SX-10-93

1992 MRS Fall Meeting, "Thermodynamics and Kinetics of Nitridation of Si Powders in Nitrogen", with T. Parker, K2.4.

1992 World Metallurgy World Congress, June 21-26, San Francisco, CA "Formation of TiC and TiB_2 Composites",

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN, "Low Voltage-High Current Density ZnO Varistors", with A. Elkind and F. Selim. 16-E-92.

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN, "Matrix Cracking in Uniaxially Fiber-Reinforced Ceramic Matrix Composites:, Part I. Effect of Matrices", with P. Kangutkar and A. S. D. Wang. 38-SII-92.

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN., "Matrix Cracking in Uniaxially Fiber-Reinforced Ceramic Matrix Composites:, Part II. Effect of Fiber diameter, Residual Stresses

and Interfacial Bonding”, with P. Kangutkar & A. S. D. Wang.

93rd Annual Meeting of Amer. Cer. Soc., April 28-May 2, 1991, Cincinnati, OH, "Reduction Kinetics of Lead Silicate Based Glasses”, with S. Kumar, A. Then and W. Tasker.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH, “Effect of Temperature and Environment on the Interfacial Shear Strengths Between SiC and Glass” with I. Tung and H.M. Chou.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH., “Reactive Sintering and Forging of In Situ Formed, Fully Dense TiB₂/TiC Composites”, with B. Houg and R. Sands.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH., “Matrix Cracking in Fiber-Reinforced Ceramic Matrix Composites”, with P. Kangutkar.

7th CIMTEC World Congress, Montecatini, Italy, June 1990."Matrix Cracking Stresses in Uniaxially Fiber Reinforced Ceramic Matrix Composites", with P. Kangutkar & A. S. Wang.

92nd Annual Meeting of the American Ceramic Society, April 22-26, 1990, Dallas, TX.,“Effect of Temperature and Fabrication Environments on Interfacial Shear Strengths in SiC Fiber-Glass Composites”, with F. Ardite and H. Chou (62-SIV-90)

91th Annual Meeting of the American Ceramic Society, May 1-5, 1989, Indianapolis, In., “Matrix Cracking Stresses in Uniaxially Fiber Reinforced Ceramic Composites”, (71-SI-89)

13th Annual Conference on Composites and Advanced Ceramics, Jan. 15-18, 1989. Cocoa Beach, Fl., "Reaction Mechanisms During Nitridation of Silicon Powder", with P. Kangutkar & M.J. Koczak. (38-C-89F).

4th Annual Northeast Meeting, Processing and Applications of High T_c Superconductors: Status and Prospects, May 9-11, Rutgers University, New Brunswick, NJ. Co-sponsors Met. Soc., MRS and ASM. "Effect of Magnetic field on Separation and Classification of Superconducting Powders", with S. Tyagi.

90th Annual Meeting of the American Ceramic Society, May 1-5, 1988, Cincinnati, OH., "Lithium Ceramic Interactions", with B. Bae. (217-B-88)

90th Annual Meeting of the American Ceramic Society, May 1-5, 1988, Cincinnati, OH “Microcracking in Ceramic Composites”, with S. Holder and S. Freiman. (26-C-88)

90th Annual Meeting of the Amer. Ceram. Soc., May 1988, Cincinnati, OH, "Use of the Meissner Effect to Separate, Purify and Classify Superconducting Powders", with D. Patten and S. Tyagi. (68-SII-88).

89th Annual Meeting of the American Ceramic Society, April 30, 1987, Pittsburg, PA., “Microcracking in Ceramic/Ceramic Composites”, with Z. Zhou. (49-C-87)

171st Meeting of the Electrochemical Society, May 10-15, 1987. Philadelphia, Pa. "Thermodynamics and Kinetics of Li/Ceramic Interactions", with K. Pytlewski.

5th International Conf. on Solid State Ionics, Aug. 18-24, 1985, Lake Tahoe, CA. "In Situ Determination of the Reactions Between Li and Fast Ion Conducting Glasses", with H. Tuller.

TEACHING

Undergraduate:

- E-848 Fundamentals of Ceramics
- E-880 Electronic Properties of Materials
- E-801 Fundamentals of Materials
- E-831 Thermodynamics of Materials Processing

Graduate:

- G-823 Structure and Properties of Ceramics and Electronic Materials
- G-880 Special Topics: "Modern Electrochemistry"
- G-880 Special Topics: "Processing of High Performance Ceramics".
- G-880 Special Topics: "Structure and Properties of Ceramics, Part II.
- G-580 Introduction to Solid State Materials.
- G 580 Special Topics: "Materials for High Temperature and Energy Applications".

PUBLIC SERVICE

Participated NSF sponsored workshop: Fundamental Research Needs in Ceramics, held in Arlington, D.C. on June 10-11, 1997.

Committee Membership

Phase Equilibria Program, Amer. Cer. Soc., 1997-2000.

Peer Reviewer

Journals: Nature, J. Amer. Cer. Soc., J. Europ. Cer. Soc., Materials Science and Engin., J. Applied Physics, Applied Physics Letters, Acta and Scripta Mater., Tribological Letters., Phys. Rev. B., Small.

Proposals: National Science Foundation, STCU.

STUDENTS SUPERVISED

PhD

- 91 P. Kangutkar, "Matrix Fracture Mechanisms in Fiber Reinforced Ceramic Composites".
- 94 S. Kumar, "Reduction Kinetics and Electrical Conductivity in Lead-Disilicate Glasses".
- 96 D. Brodtkin "Transient Plastic Phase Processing of Ti-B-C Composites & their Properties"
- 97 T. El Raghy, "Processing and Characterization of Ti_3SiC_2 ", with A. Zavaliangos and S. Kalidindi.
- 00 C. Wilkinson Mager, "Development of a Zirconi Toughened Hydroxyapatite", with L. Shadler.
- 01 M. Radovic, "Effect of Temperature and Microstructure of Tensile and Tensile Creep Properties of Ti_3SiC_2 in Air". With T. El-Raghy.

- 03 P. Finkel, "Low Temperature Elastic and Electronic Properties of MAX Phases".
- 04 A. Murugaiah, "Nanoindentations in Kinking Nonlinear Elastic Solids", with S. Kalidindi.
- 04 T. Zhen, "Compressive Behavior of Kinking Nonlinear Elastic Solids - Ti₃SiC₂, Graphite, Mica and BN", with S. Kalidindi.
- 06 A. Ganguly, "Synthesis and Characterization of MAX Phase Solid Solutions".
- 06 S. Gupta, "Tribology of MAX Phases and Their Composites".
- 06 E. Hoffman, "Carbide Derived Carbon from MAX-Phases and their Separation Applications", with Y. Gogotsi.
- 08 S. Basu, "On Spherical Nanoindentation Stress-Strain Curves, Creep and Kinking Nonlinear Elasticity in Brittle, Hexagonal Single Crystals", with S. Kalidindi.
- 08 A. Zhou, "Kinking Nonlinear Elastic Solids: Theory and Experiments", with S. Kalidindi.
- 09 S. Amini, "On the Effect of Texture on Kinking Non-Linear Elasticity of MAX Phases and MAX-reinforced Mg Matrix Composites"
- 09 A. R. Sakulich, "Mechanical and Chemical Characterization of Alternative Cements and Ancient Building Materials"
- 09 T. Scabarozi, "MAX Thin Films; Synthesis and Characterization"
- 11 A. Moseson, "Earth Cements and their Applications".
- 12 M. Shamma, "Acoustic Coupling Technique of Kinking Non-linear Solids"
- 12 B. Anasori, "Mg/MAX Composites: Characterization and Properties"
- 13 N. Lane, "*Ab initio* Modeling of Kink Boundaries in Kinking Non-linear Elastic Solids"
14. M. Naguib, "Exfoliation of MAX Phases"
14. D. Tallman, "Neutron Irradiation of MAX Phases"

MASTERS

- 88 B. Bae, "Interactions of Lithium with Lithium Borates".
- 89 P. Kangutkar, " Processing of Reaction Bonded Silicon Nitride", with M. Koczak.
- 90 J. Medoff, "Processing/Property Relationships in Y₁Ba₂Cu₃O_{7-x}".
- 90 S. Liou, "Ceramic Thermal Barrier Coatings on Graphite Epoxy Composites", with R. Smith
- 91 B. Houg, "Transient Plastic Phase Processing of Ti-B-C Composites".

- 92 T. Lien, "ZrC/ZrB₂ Composites Processed by Reaction Hot Pressing"
- 93 T. Parker, "Thermodynamics and Kinetics of the Nitridation of Si Powders in N₂"
- 93 P. Ciccone, "The Design and Fabrication of Sudragon IV".
- 98 S. Chakraborty, "Processing and Characterization of Some H-phases", with T. El-Raghy.
- 99 M. Ali, "Processing and Characterization of Ti₂AlC, Ti₂AlC_{0.5}N_{0.5} and Ti₂AlN", with T. El-Raghy
- 99 A. Procopio, "Synthesis and Characterization of Ti₄AlN₃", with T. El-Raghy.
- 01 I. Salama, "Synthesis and Characterization of the Ternary Carbides Nb₂AlC and (Ti,Nb)₂AlC" with T. El-Raghy.
- 02 J. Travaglini, "Corrosion Behavior of Ti₃SiC₂"
- 02 L. Ho-Duc, "Synthesis and Characterization of the Properties of Ti₃SiC₂/SiC and Ti₃SiC₂/TiC Composites".
- 07 A. Moseson, "Spherical Nanoindentation: Insights And Improvements, Including Stress-Strain Curves and Effective Zero Point Determination".
- 09 J. Lloyd, "Investigation of the Ternary Carbides Nb₂PC and Mo₂BC"
- 10 I. Albaryak, "Mechanical Properties of Polycrystalline Ceramics as Determined by Nanoindentation Methods: Effect of Surface Roughness and Tip Size"
- 10 C. J. Spencer, "Fiber-Reinforced Ti₃SiC₂ and Ti₂AlC MAX Phase Composites"