



## Publications 2012 - 2017

**Total number published, in press, or accepted: 301**

\* Joint publications between CMEDE consortium and ARL researchers

### Ceramics

#### 2017

- 1 An, Q. and Goddard, W. "Ductility in Crystalline Boron Subphosphide (B12P2) for Large Strain Indentation." *J. Phys. Chem. C* 121. 30 (2017): 16644-16649
- 2 An, Q. and Goddard, W. "Improved Ductility of B12 Icosahedra-based Superhard Materials through Icosahedral Slip." *J. Phys. Chem. C* 121. 21 (2017): 11831-11838
- 3 An, Q., Reddy, M., Xie, K., Hemker, K., and Goddard, W. "Erratum: New Ground-State Crystal Structure of Elemental Boron [Phys. Rev. Lett. 117, 085501 (2016)]." *Phys. Rev. Lett.* 118. 15 (2017): 59902-59902
- 4 An, Q. and Goddard, W. "Nanotwins soften boron-rich boron carbide (B13C2)." *Applied Physics Letters* 110. 11 (2017): 11902-11902
- 5 An, Q., Reddy, M., Xie, K., Hemker, K., and Goddard, W. "An et al. Reply." *Phys. Rev. Lett.* 118. 8 (2017): 89602-89602
- 6 Cereceda Senas, D., Graham-Brady, L., and Daphalapurkar, N. "Modeling dynamic fragmentation of heterogeneous brittle materials." *International Journal of Impact Engineering* 99. (2017): 85-101
- 7 Farbaniec, L., Hogan, J., Xie, K., Shaeffer, M., Hemker, K., and Ramesh, K. "Damage evolution of hot-pressed boron carbide under confined dynamic compression." *International Journal of Impact Engineering* 99. (2017): 75-84
- 8 Hernández-Rivera, E., Coleman, S., and Tschopp, M. "Using Similarity Metrics to Quantify Differences in High-Throughput Data Sets: Application to X-ray Diffraction Patterns." *ACS Combinatorial Science* 19. 1 (2017): 25-36
- 9 \*Hogan, J., Farbaniec, L., Mallick, D., Domnich, V., Kuwelkar, K., Sano, T., McCauley, J., and Ramesh, K. "Fragmentation of an advanced ceramic under ballistic impact: Mechanisms and microstructure." *International Journal of Impact Engineering* 102. (2017): 47-54
- 10 Khan, A., Domnich, V., and Haber, R. "Boron carbide based ceramics: Problems and possible solutions." *ACerS Bulletin* 96. 6 (2017): 30-35
- 11 Ramesh, K., Stickle, A., and Kimberley, J. "Rocks, Shocks and Asteroids, and Some Interesting Research Directions in Mechanics." *Experimental Mechanics* 57. 8 (2017): 1149-1159
- 12 Swab, J., Meredith, C., Casem, D., and Gamble, W. R. "Static and dynamic compression strength of hot-pressed boron carbide using a dumbbell-shaped specimen." *Journal of Materials Science* 52. 17 (2017): 10073-10084
- 13 Taylor, D. "Convergence acceleration of molecular dynamics methods for shocked materials using velocity scaling." *Molecular Physics* 115. 5 (2017): 603-617
- 14 Taylor, D. "Molecular dynamics simulation of the Hugoniot states of boron suboxide." *Materials Letters* 188. (2017): 331-333
- 15 Toksoy, M. F., Rafaniello, B., Xie, K., Ma, L., Hemker, K., and Haber, R. "Densification and characterization of rapid carbothermal synthesized boron carbide." *International Journal of Applied Ceramic Technology* 14. 3 (2017): 443-453
- 16 \*Tonge, A. and Ramesh, K. "Corrigendum to: Multi-scale defect interactions in high-rate brittle material failure. Part I: Model formulation and application to AION." *Journal of the Mechanics and Physics of Solids* 106. (2017): 313-314
- 17 \*Xie, K., Domnich, V., Farbaniec, L., Chen, B., Kuwelkar, K., Ma, L., McCauley, J., Haber, R., Ramesh, K., and Chen, M. "Microstructural Characterization of Boron-rich Boron Carbide." *Acta Materialia* 136. (2017): 202-214

#### 2016

- 1 An, Q., Reddy, M., Xie, K., Hemker, K., and Goddard, W. "New Ground-State Crystal Structure of Elemental Boron." *Phys. Rev. Lett.* 117. 8 (2016): 85501-85501
- 2 An, Q., Reddy, M., Qian, J., Hemker, K., Chen, M., and Goddard, W. "Nucleation of amorphous

- shear bands at nanotwins in boron suboxide." *Nature Communications* 7. (2016): 1-7
- 3 An, Q., Samwer, K., Demetriou, M. D., Floyd, M. C., Duggins, D. O., Johnson, W. L., and Goddard, W. "How the toughness in metallic glasses depends on topological and chemical heterogeneity." *Proceedings of the National Academy of Sciences* 113. 26 (2016): 7053-7058
  - 4 An, Q., Reddy, M., Dong, H., Chen, M., Oganov, A. R., and Goddard, W. "Nanotwinned Boron Suboxide (B6O): New Ground State of B6O." *Nano Letters* 16. 7 (2016): 4236-4242
  - 5 An, Q., Goddard, W., Xie, K., Sim, G., Hemker, K., Munhollon, T., Toksoy, M. F., and Haber, R. "Superstrength through Nanotwinning." *Nano Letters* 16. 12 (2016): 7573-7579
  - 6 Coleman, S., Hernandez, E., Behler, K. D., Synowczynski-Dunn, J., and Tschopp, M. "Challenges of Engineering Grain Boundaries in Boron-Based Armor Ceramics." *JOM* 68. 6 (2016): 1605-1615
  - 7 \*Farbaniec, L., Hogan, J., McCauley, J., and Ramesh, K. "Anisotropy of Mechanical Properties in a Hot-Pressed Boron Carbide." *International Journal of Applied Ceramic Technology* 13. 6 (2016): 1008-1016
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  - 9 \*Hilton, C. D., McCauley, J. W., Swab, J., Shanholtz, E. R., and Chen, M. "Using Hardness Tests to Quantify Bulk Plasticity and Predict Transition Velocities in SiC Materials." *International Journal of Applied Ceramic Technology* 10. 1 (2016): 114-122
  - 10 Hogan, J., Farbaniec, L., Daphalapurkar, N., and Ramesh, K. "On Compressive Brittle Fragmentation." *Journal of the American Ceramic Society* 99. 6 (2016): 2159-2169
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  - 13 Li, G., An, Q., Goddard, W., Hanus, R., Zhai, P., Zhang, Q., and Snyder, G. J. "Atomistic explanation of brittle failure of thermoelectric skutterudite CoSb 3." *Acta Materialia* 103. (2016): 775-780
  - 14 Liu, J. and Graham-Brady, L. "Effective anisotropic compliance relationships for wing-cracked brittle materials under compression." *International Journal of Solids and Structures* 100. (2016): 151-168
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  - 17 \*Reddy, M., Hwang, C., Ornek, M., Lavenstein, S., Goddard, W., Burgess, A., Haber, R., and Doherty, K. "Observations of nanocrystalline cubic boron nitride formed with plasma spraying." *Acta Materialia* 116. (2016): 155-165
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subjected to laser shock compression." Proceedings of the National Academy of Sciences 113. 43 (2016): 12088-12093

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- 1 An, Q. and Goddard, W. "Atomistic Origin of Brittle Failure of Boron Carbide from Large-Scale Reactive Dynamics Simulations: Suggestions toward Improved Ductility." Phys. Rev. Lett. 115. (2015): 5501-5506
- 2 Aydelotte, B. and Schuster, B. "Impact and Penetration of SiC: The Role of Rod Strength in the Transition from Dwell to Penetration." Procedia Engineering 103. (2015): 19-26
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- 7 Clayton, J. "Penetration resistance of armor ceramics: Dimensional analysis and property correlations." International Journal of Impact Engineering 85. (2015): 124-131
- 8 Farbaniec, L., Hogan, J., and Ramesh, K. "Micromechanisms associated with the dynamic compressive failure of hot-pressed boron carbide." Scripta Materialia 106. (2015): 52-56
- 9 Gao, Y., Rafaniello, B., Toksoy, M. F., Munhollon, T., and Haber, R. "Improvement of crystallization and particle size distribution of boric acid in the processing of a boron carbide precursor." RSC Adv. 5. 25 (2015): 19067-19073
- 10 Graham-Brady, L., Katcoff, Z., Mayercsik, N. P., and Kurtis, K. E. "Micromechanical Model and Associated Validation for Dynamic Failure of Brittle Materials Containing Pores and Slit-Like Flaws." Journal of Engineering Mechanics 141. 10 (2015): 5-10
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- 15 Schuster, B., Aydelotte, B., Leavy, B., Satapathy, S., and Zellner, M. "Concurrent Velocimetry and Flash X-ray Characterization of Impact and Penetration in an Armor Ceramic." Procedia Engineering 103. (2015): 553-560
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## 2013

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## 2012

- 1 Clayton, J., Kraft, R. H., and Leavy, B. "Mesoscale modeling of nonlinear elasticity and fracture in ceramic polycrystals under dynamic shear and compression." *International Journal of Solids and Structures* 49. 18 (2012): 2686-2702
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## Composites

### 2017

- 1 An, Q., Tamrakar, S., Gillespie, J., Rider, A., and Thostenson, E. "Tailored Glass Fiber Interphases via Electrophoretic Deposition of Carbon Nanotubes: Fiber and Interphase Characterization." *Composite Science and Technology*. In press.
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  - 16 Yeager, M., Simacek, P., and Advani, S. "Role of fiber distribution and air evacuation time on capillary driven flow into fiber tows." *Composites Part A: Applied Science and Manufacturing* 93. (2017): 144-152
- 2016**
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- ## 2015
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## Summary

### *Published, in press, and accepted*

	2012	2013	2014	2015	2016	2017	Total
<b>Ceramics</b>	7	5	7	20	23	17	79
<b>Composites</b>	6	2	5	13	18	9	53
<b>Integrative</b>	2	4	6	4	3	2	21
<b>Metals</b>	6	11	20	13	20	17	87
<b>Polymers</b>	10	8	11	8	9	15	61
<b>Total</b>	31	30	49	58	73	60	301
<b>Joint</b>	9	11	6	9	16	14	65