MSE Faculty and Staff

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Jun Cui

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Title(s)

- Associate Professor
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Information

Dr. Cui holds joint positions at Ames Laboratory and Materials Science Department at the Iowa Stated University. His group manages extensive materials synthesis, sample preparation and characterization capability for the department and for the Ames Laboratory, and has access to state-of-art national characterization facilities at Ames Laboratory, Pacific Northwest National Laboratory, Argonne National Laboratory, and at NIST. His frontier research on energy-related science and engineering and wide industry collaboration provide students extensive exposure to the state-of-art research philosophy and methodology, which is crucial for students' career development.

Education

- 2002 Ph.D. in Mechanics, University of Minnesota, Minneapolis, MN
- 2000 M. Eng. in Electrical Engineering, University of Minnesota, Minneapolis, MN
- 2000 M. S. in Mechanics, University of Minnesota, Minneapolis, MN
- 1992 B. S. in Materials Science, Zhejiang University, Hangzhou, China

Interest Areas

Dr. Cui's research focuses on ferroic materials and their applications in clean energy applications. Current research projects include 1) high fatigue life elastocaloric materials for cooling and refrigeration; 2) low critical field rare-earth-free magnetocaloric materials for room temperature and cryogenic refrigeration; 3) high silicon content electrical steel for transformer and motors; 4) rare-earth-free permanent magnetic materials for motors; 5) additive manufacturing of rare-earth magnetic materials for efficient use of critical materials; 6) high throughput alloy development for light weight structural materials and for harsh environmental applications.

Publications

1. Hou H, Simsek E, Stasak D, Al Hasan N, Qian S, Ott R, Cui J, Takeuchi I. Elastocaloric cooling of additive manufactured shape memory alloys with large latent heat. Journal of Physics D: Applied Physics. 2017 Sep 12;50(40):404001
2. Pecharsky VK, Cui J, Johnson DD. (Magneto) caloric refrigeration: is there light at the end of the tunnel?. Phil. Trans. R. Soc. A. 2016 Aug 13;374(2074):20150305.
3. Rana TH, Manchanda P, Balamurugan B, Kashyap A, Gao TR, Takeuchi I, Cun J, Biswas S, Sabirianov RF, Sellmyer DJ, Skomski R. Micromagnetism of MnBi: FeCo thin films. Journal of Physics D: Applied Physics. 2016 Jan 28;49(7):075003.
4. Qian, S., Geng, Y., Wang, Y., Ling, J., Hwang, Y., Radermacher, R., ... & Cui, J. (2016). A review of elastocaloric cooling: materials, cycles and system integrations. *International Journal of Refrigeration*, *64*, 1-19.
5. Kirkeminde A, Shen J, Gong M, Cui J, Ren S. Metal-Redox Synthesis of MnBi Hard Magnetic Nanoparticles. Chemistry of Materials. 2015;27(13):4677-81.
6. Cui J, Choi JP, Li G, Polikarpov E, Darsell J, Overman N, et al. Thermal stability of MnBi magnetic materials. Journal of Physics Condensed Matter. 2014;26(6).
7. Cui J, editor Shape memory alloys and their applications in power generation and refrigeration. 2013 MRS Spring Meeting, April 1, 2013 - April 5, 2013; 2013; San Francisco, CA, United states: Materials Research Society.

8. Cui J, Wu Y, Muehlbauer J, Hwang Y, Radermacher R, Fackler S, et al. Demonstration of high efficiency elastocaloric cooling with large ΔT using NiTi wires. Applied Physics Letters. 2012;101(7):073904.
9. Cui J, Chu YS, Famodu OO, Furuya Y, Hattrick-Simpers J, James RD, et al. Combinatorial search of thermoelastic shape-memory alloys with extremely small hysteresis width. Nature Materials. 2006;5(4):286-90.
10. Cui J, Shield TW, James RD. Phase transformation and magnetic anisotropy of an iron-palladium ferromagnetic shape-memory alloy. Acta Materialia. 2004;52(1):35-47.