Inside: Energy Quarterly EQ

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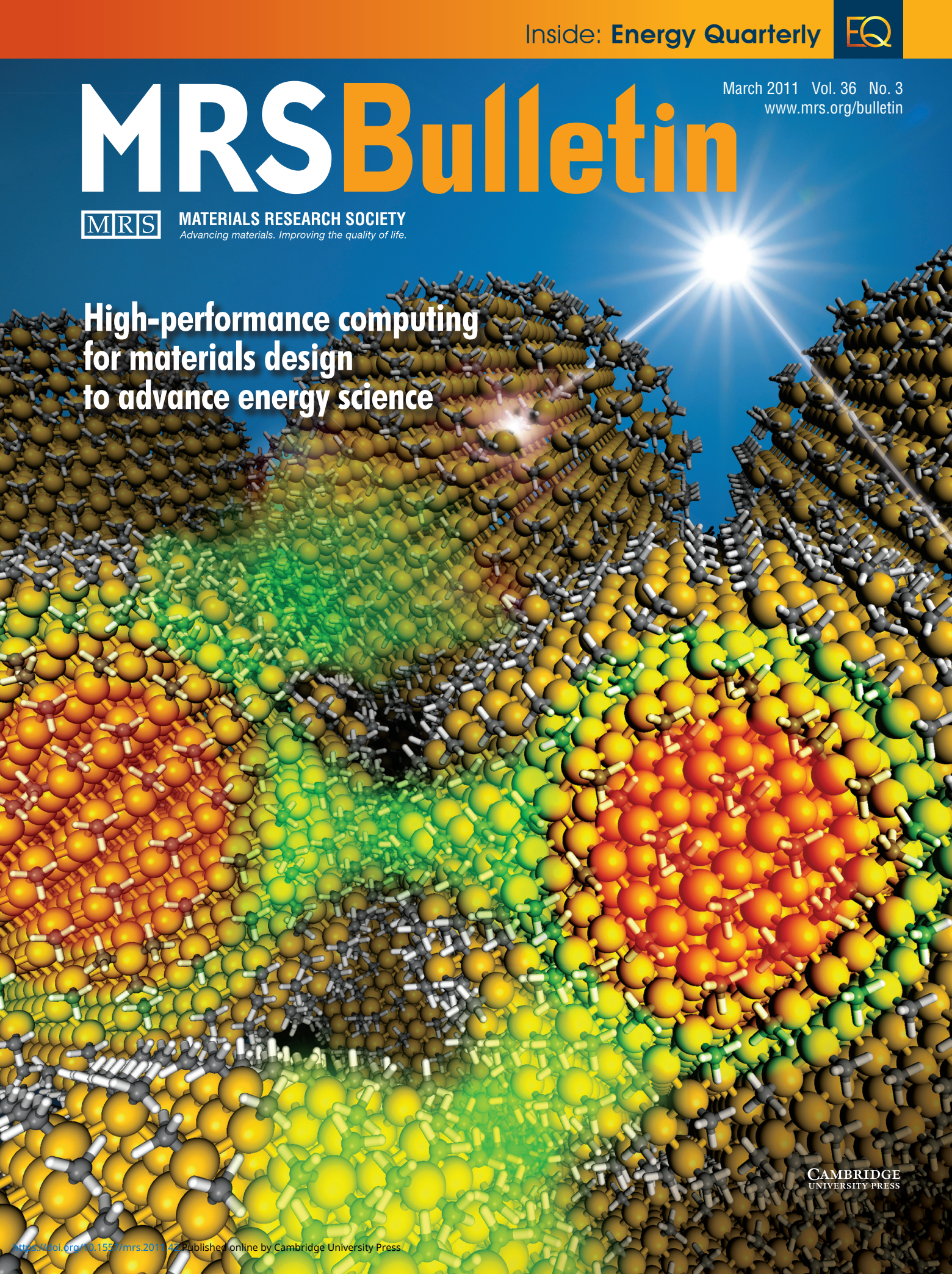
MRS Bulletin

MRS MATERIALS RESEARCH SOCIETY
Advancing materials. Improving the quality of life.

High-performance computing for materials design to advance energy science



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The first truly global foundry

In January 2010, the semiconductor foundry landscape changed forever with the launch of the new GLOBALFOUNDRIES. This new entrant to the market combined the leading-edge integrated device manufacturing heritage of Advanced Micro Devices (AMD) with the pure-play semiconductor foundry heritage of Chartered Semiconductor to create a company with an impressive capacity and technology footprint and a world-class customer base.

Headquartered in Silicon Valley, our leading edge technology company has well over 10,000 employees with an extensive 200mm and 300mm silicon wafer manufacturing campus in Singapore. This is complemented by a leading-edge 300mm manufacturing campus in Dresden, Germany and a third campus under construction in Saratoga County, New York, that once complete should be the most advanced in the world. These global operations provide a unique opportunity for us to attract and leverage the best engineering and technical talent from around the world to support long-term growth and expansion opportunities.

GLOBALFOUNDRIES

www.globalfoundries.com

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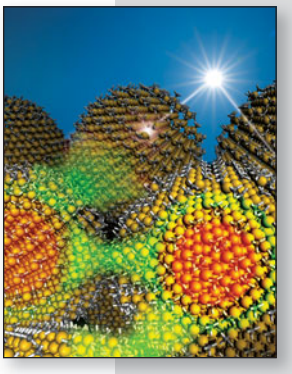

ON THE COVER

High-performance computing for materials design to advance energy science. This issue of *MRS Bulletin* explores the many ways in which high-performance computing is being used to design materials that improve the collection, conversion, and storage of energy. Such computational design projects typically scrutinize architectures and processes at the atomic level. For instance, the cover image illustrates the collection of solar energy by silicon atoms (small tan spheres) assembled into quantum dots (large spheres) that are then functionalized with ligands to shield them from oxidation and/or change their electronic properties. The dots shown are comprised of thousands of silicon atoms and have diameters on the order of four nanometers. A given absorbed photon from the sun generates an exciton, a coupled electron–hole-pair depicted as diffuse, adjacent green and orange regions. This quasi-particle is initially confined to a single quantum dot but can subsequently tunnel to neighboring dots until it reaches a collection center. There the electron and hole are separated, resulting in an electrical current. The graphic was created by Mark Lusk, Department of Physics, Colorado School of Mines. See the technical theme that begins on p. 169.

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About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes almost 16,000 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and close to 70 countries.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across the many technical fields touching materials development. MRS sponsors two major international annual meetings encompassing approximately 70 topical symposia, and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction in local geographic regions through Sections and University Chapters.

MRS participates in the international arena of materials research through the International Union of Materials Research Societies (IUMRS). MRS is a member of ASTRA and is an affiliate of the American Institute of Physics.

MRS publishes symposium proceedings, *MRS Bulletin, Journal of Materials Research*, and other publications related to current research activities.

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