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MRSBulletin

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

Electron-emission materials

ALSO IN THIS ISSUE

A holistic view of nucleation and self-assembly



CUSTOMIZED PRODUCTION ION IMPLANTERS



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2017 MRS FALL MEETING & EXHIBIT

November 26–December 1, 2017 | Boston, Massachusetts

PREREGISTRATION OPENS MID-SEPTEMBER

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- BI01 Community College and University Partnerships as Catalysts for Promoting Materials Science Education
- BI02 Materials Innovation for Sustainable Agriculture and Energy

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- BM02 Multiphase Fluids for Materials Science— Droplets, Bubbles and Emulsions
- BM03 Biological and Bioinspired Materials for Photonics and Electronics— From Living Organisms to Devices
- BM04 Biomaterials for Regenerative Engineering
- BM05 Polymer Gels in Materials Science— 3D/4D Printing, Fundamentals and Applications
- BM06 2D Nanomaterials in Health Care
- BM07 Emerging Materials and Devices for Engineering Biological Function and Dynamics
- BM08 Materials Design for Neural Interfaces
- BM09 Stretchable Bioelectronics— From Sensor Skins to Implants and Soft Robots
- BM10 Bioinspired Interfacial Materials with Superwettability
- BM11 Modeling, Characterization, Fabrication and Applications of Advanced Biopolymers—Where Form Meets Function
- BM12 Biomolecular Self-Assembly for Materials Design

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- EM02 Multiferroics and Magnetoelectrics
- EM03 Novel Materials and Architectures for Plasmonics— From the Ultraviolet to the Terahertz
- EM04 Wide- and Ultra-Wide-Bandgap Materials and Devices
- EM05 Oxide Interfaces—Lattice and Electronic Defect Interactions
- EM06 Diamond Electronics, Sensors and Biotechnology— Fundamentals to Applications
- EM07 Materials, Devices and Architectures for Neuromorphic Engineering and Brain-Inspired Computing
- EM08 Emerging Materials for Quantum Information
- EM09 Electronic and Ionic Dynamics at Solid-Liquid Interfaces
- EM10 Solution-Processed Inorganics for Electronic and Photonic Device Applications

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- ES04 Interfaces in Electrochemical Energy Storage
- ES05 Materials and Design for Resilient Energy Storage
- ES06 Alkali Solid Electrolytes and Solid-State Batteries
- ES07 Chromogenic Materials and Devices
- ES08 Advanced Nuclear Materials-Design, Development and Deployment
- ES09 Thermal Energy—Transfer, Conversion and Storage
- ES10 Materials Efficiency to Enable a Circular Materials Economy
- ES11 Silicon for Photovoltaics



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- Nanostructures NM04 Atomically Thin, Layered and 2D Non-Carbon Materials and Systems
- NM05 Nanomaterials, Nanoparticles and Nanostructures Produced by Plasmas— Synthesis, Characterization and Applications
- NM06 Semiconductor Nanocrystals, Plasmonic Nanoparticles and Metal-Hybrid Structures
- NM07 Nanostructure-Based Optical Bioprobes—Advances, Trends and Challenges in Optical and Multimodular Bioimaging and Sensing
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PROCESSING AND MANUFACTURING

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- PM02 Advances and Upcoming Research Strategies in Reactive Materials
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- PM04 Micro-Assembly Technologies—Fundamentals to Applications

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- TC02 In Situ Studies of Materials Transformations
- TC03 Emerging Prospect and Capabilities in Ion Beam Technology and Applications
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- TC06 Mechanical Behavior at the Micro and Nanoscale— Bridging Between Computer Simulations and Experiments
- TC07 Design, Control and Advanced Characterization of Functional Defects in Materials

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ON THE COVER

Electron-emission materials: New generations of emission devices are continuously being improved based on innovative materials and the introduction of physical concepts. Nanotubes, nanowires, graphene, and electron emission models are discussed in this issue, as well as original mechanisms, such as the thermoelectric effect, thermionic emission, and heat-trap processes. The cover shows a photograph of a thermoelectronic energy converter in

operation and a sketch of a thermoelectronic energy converter, which shows that input energy absorbed in the top electrode (emitter) causes the emission of electrons, and are guided by a grid potential to the bottom electrode (collector). Images courtesy of R. Wanke et al. See the technical theme that appears on page **488**.



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About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973 and headquartered in Warrendale, Pennsylvania, USA, promotes interdisciplinary materials research. Today, MRS is a growing, vibrant, member-driven organization of over 16,000 materials researchers spanning over 80 countries, from academia, industry, and government, and a recognized leader in the advancement of interdisciplinary materials research.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across many scientific and technical fields touching materials development. MRS conducts three major international annual meetings and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction through University Chapters. In the international arena, MRS implements bilateral projects with partner organizations to benefit the worldwide materials community. The Materials Research Society Foundation helps the Society advance its mission by supporting various projects and initiatives.

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