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Foreword: Special Section on Electrical Contacts

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Abstract:

Welcome to the Special Topics Section dedicated to the 2015 Holm Conference on Electrical Contacts. This Special Section contains six high-quality papers that comprehensively describe the state of the art and potential future directions for topics of great interest to our readers. The Editor-in-Chief (EIC), in consultation with the other EICs, Associate Editors (AEs), and domain experts, selects the topics for the Special Sections, and a Guest Editor or AE (GE/AE) who is a leading expert in the technical area then directs the solicitation and peer review of the papers. In cases where the GE/AE is also an author, the EIC is responsible for the peer review to avoid any real or perceived conflicts of interest.

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This Special Topics Section focuses on new and emerging technologies in the electrical contacts area, including advanced modeling, promising new contact materials, microcontacts and microelectromechanical systems (MEMS) switches, and improved direct current (dc) circuit breaker topologies needed for electric vehicles and high-voltage solar applications.

- The paper “Evaluation of Electric-Thermal Performance of High-Power Contact Systems With the Voltage-Temperature Relation” addresses observed deviations in the voltage-temperature relation for large contact systems when radiation and convection are significant.
- The paper “Finite-Element Contact Modeling of Rough Surfaces Applied to Au-Coated Carbon Nanotube Composites” uses advanced modeling to predict microcontact performance when using rough multiwalled carbon nanotube contacts coated with thin-film gold.
- The paper “Influence of Small Weight Percentages of Bi and Systematic Coefficient of Thermal Expansion Variations on Sn Whiskering” evaluates key materials and mechanisms of tin whiskering to minimize their deleterious effects on electrical contacts.
- The paper “Improving Gold/Gold Microcontact Performance and Reliability Under Low-Frequency AC Through Circuit Loading” studies the effects of various external circuit loadings and their effect on microcontact and MEMS switch performance and reliability.
- The paper “Hybrid DC Circuit Breaker Feasibility Study” investigates using hybrid devices consisting of semiconductor and mechanical contacts for make/break operations needed in dc grid, switchgear, and high-voltage dc applications.
- The paper “Contact Welding Mechanism With Bounce Arc on Ag and Cu Contacts in Low-Voltage Switches” studies the mechanisms of contact bounce and arcing upon switch make and their combined relationship to contact welding.

We acknowledge all of the authors who contributed papers and all of the reviewers for their thorough reviews. We hope that this issue will serve as a valuable resource for the research community, as well as a catalyst to boost more new research and exploration in the electrical contacts field.