Special Issue

Functional Oxides and Hybrid Materials for Memristive Devices

Message from the Guest Editors

This Special Issue will focus on the critical role that innovations in materials science will play in advancing memristor performance and in enabling new device functionalities. Transition metal oxides (MOs) and composite heterostructures—such as HfO2, Al2O3, TiO2, and their bilayer or doped variants—have shown significant potential due to their tunable electrical properties, high endurance, multilevel conductance states, and analog switching characteristics that mimic biological synapses. This Special Issue seeks contributions that bridge innovation in material and device performance in memristive systems. Emphasis is placed on experimental and theoretical studies linking material properties to switching behavior, endurance, retention, and scalability in memory and neuromorphic circuits. Submissions on device engineering - including switching materials, interfaces, defect dynamics, and adaptive materials - are welcome. Additionally, we seek work on reliability, novel switching mechanisms, and real-world integration. This collection aims to advance memristive tech and foster collaborations for intelligent computing.

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Message from the Editor-in-Chief

Materials (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

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