Special Issue

Smart Materials in Robotics and Actuators

Message from the Guest Editors

Smart actuator materials, including magnetorheological fluid (MRF), magnetorheological elastomer (MRE), piezoelectric material (PM), shape memory alloy (SMA), shape memory polymer (SMP), dielectric elastomer (DE), etc., have high application potential in soft mechatronics and robotics, such as soft grippers, artificial muscles, wearables, haptics equipment, and biomedical devices. The adaptability, design flexibility, reconfigurability, and versatility of smart soft materials enable applications that are not possible with traditional rigid robots and actuators. This Special Issue aims to describe various smart actuator materials technologies, provide insight into the latest scientific research in smart materials, and discuss how they are related to actuation and robotic application. We encourage submissions of papers presenting original research findings or novel reviews that could summarize the current state of the art on the topic.

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Message from the Editorial Board

We are just entering the Next Wave of Technology (NWT) where actuators will play the same role as the computer chip did for computers/social media approximately four decades ago. Just in the U.S., production of $1 trillion year of electromechanical systems (vehicles, orthotics, manufacturing cells, freight trains, aircraft, etc.) will be impacted by the NWT, all driven by actuators. Five key trends can be found for the future perspectives: “Performance to Reliability”, “Hard to Soft”, “Macro to Nano”, “Homo to Hetero” and “Single to Multi functional”. We invite papers that primarily impact these economic sectors; those illustrating basic scientific principles are also welcome.

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