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Inaugural editorial

ABSTRACT

It is our privilege to start the first issue of our new Journal "Smart Materials in Manufacturing" (SMMF). Owing to their ability to transform and react over time due to a controlled response to an external stimulus, smart materials are becoming mainstream in several fields of research for advanced applications in biomedicine, robotics, transportation, and defense. SMMF aims to explore how smart materials can be successfully manufactured into actuating structures capable of real-word functionality. New submissions are welcome that investigate and discuss existing and emerging methods for processing novel smart materials and systems, for characterising such constructs, and for assessing their morphing ability.

Editorial

We are pleased to launch our new journal, *Smart Materials in Manufacturing* (SMMF), and to welcome you all to this inaugural issue.

Smart materials are an emerging class of engineered materials whose behavior changes in a controlled way as a response to external stimuli such as applied stresses, variations in temperature, moisture, or pH, or exposure to electric or magnetic fields, light, or chemical substances. In a broader perspective, smart materials are reactive materials, since they have the capability to sense and react to changes in the environment. They are also intelligent materials, since they are able to adapt their properties over time to address variable working conditions and requirements. Inspired by nature, smart materials may be capable of self-deformation and self-folding, self-sensing and self-response, self-adaptability and self-repair. Systems and sensors that make use of smart materials are becoming prevalent in areas of strategic importance such as the biomedical field, robotics, civil engineering, transportation, space, aeronautics, and defense.

As smart materials progress from being exotic curiosities for scientists to becoming integral parts of fully functional devices, new manufacturing methods need to be developed to translate the targeted morphing properties into the designed structures and microstructures, to scale up the production volumes while maintaining reliability and economic competitiveness, and to streamline and verify the supply chain.

A pillar of the Industry 4.0 revolution, additive manufacturing is subverting our traditional approach to fabrication, paving the way for unprecedented freedom in part geometry and for affordable customization. Coupling 3D printing and smart materials offers the potential to purposefully create almost any physical object with the desired morphing capabilities. The introduction of "time" as the fourth dimension in 3D printing in order to process a programmed material is the seed idea behind 4D printing. Driven by the exciting prospect of producing bespoke stimulus-responsive structures, medical devices, and robotic components, research to figure out how the dynamic response of smart materials can be integrated into additive manufacturing, maintained, and skillfully manipulated upon printing is flourishing.

The aim of our new journal is thus to publish contributions that tackle the challenges of exploring and understanding the complex relationships between smart materials and manufacturing. We seek original research papers, authoritative reviews, and leading opinions that focus on existing and emerging fabrication methods for processing novel smart materials and systems, on the characterization of such constructs, and on the assessment of their capability to achieve real-world functionality.

The scope of SMMF embraces the entire workflow underlying the manufacturing of smart materials, which involves materials design, feedstock preparation, processing and post-processing, characterization of materials and products, part validation, and industrial scale-up. Due to the multidisciplinary nature of smart materials in manufacturing, topics of interest sit at the crossroads of many fields: materials science and technology; chemistry; design optimization; artificial intelligence in manufacturing and materials processing; (multi-)materials and (multi-)physics modeling; surfaces and interfaces; characterization of materials and components; interrogation of responses and signals emanating from constructed materials; quality assurance; traceability; industrial uptake; and logistics.

The new journal's editorial team comprises an internationally respected pool of researchers and technologists bringing together different areas of expertise in materials science and engineering. Since our goal is to promote a broad and exhaustive approach to the manufacturing of smart materials, the journal will welcome special issues on cutting-edge topics proposed by leading scientists who can volunteer to act as guest editors.

In order to align with current trends in publishing as well as the regulations of research funding agencies worldwide, SMMF is an open access journal. All accepted articles will be immediately and permanently free to all to read and download. Submitted articles will be peer-reviewed to ensure integrity and transparency, and to deliver the highest scientific quality. We are aware that, in a fast-moving field of research like the

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manufacturing of smart materials, the speed of publication is crucial. Editors and editorial board members are committed to providing prompt decisions, effective review processes, and short publication times. We firmly believe that the success and reputation of a journal result from the synergistic efforts of authors, editors, and reviewers.

Now, we look forward to receiving your contributions.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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