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Editorial



According to a definition dated 1996, by Spielman at al. (Smart Mater. Struct. 5, 247) “A smart material and/or structure is designed for a specific functional purpose, and in fulfilling this purpose, it operates at a higher level of performance than its conventional counterpart. The system senses its internal state and external environment, and makes decisions and/or responds based on the data obtained to meet functional requirements. These decisions and adaptations are made through the use of feedback and memory. Most smart materials and structures basically mimic biological systems, they need only those biological functions that are required to meet functional purpose for which the system is designed”. Since then, the landscape of smart materials has come to cover a wide, still growing range of technologies, applications, mechanical systems and signal processing, sensors and actuators for the detection of bioactivity, droplet applications, biodegradable packing, adaptive absorbers, drug delivery systems, inkjet printing, photonic applications.

The search of smart performances has evolved into definitions of smart platforms, sensitive to external stimuli such as pH and temperature, bioinspired fibers, recombinant proteins with smart behavior tuned by aminoacids, electro-rheological and magneto-rheological elastomer shape memory, stimuli responsive self-assembled materials, smart dyes among the others. The development of chemistry and physics has been functional to the development of smart materials, as it led to the material handling level far beyond the macroscopic dimension, thus succeeding in operating on the nanometer scale. This conveyed to the intervention on the matter by recombining it and designing it from the individual atoms and atoms assembles, creating “tailor-made” microscopic composites, fully artificial, yet efficient, stable, performing, selective, mimicking nature.

Through this special issue on “Smart materials, smart application of new materials” we intend to provide a state-of-the-art overview on the smart direction of future materials and technologies.

In outlining the contents of the topic, we gave space to electro- and magnetorheological properties of fluids and their medical and

mechanical applications. Aspects of polymer applications are included as materials for contact lenses and shape memory. Smart sensors for leukemia detection are also part of the issue as well as applications of fibers and nanotubes-hybrids, remote, and wireless control of processes. Bioinspired processes find their place as for the usage of micro-organisms for the preservation of cultural heritage, the synthesis of nanoparticles and their use in mosquitoes control and in catalysis.

The call has received world-wide attention and we have now contributions from Korea, Iraq, India, Italy, South Africa, Canada, Brazil, Malaysia, Portugal, UK, Saudi Arabia, Tunisia, Thailand, and Egypt. All papers underwent a careful screening and peer review, according to the highest standards.

I wish to express my thankfulness to all the people who contributed to this special issue and made it possible to establish it. First of all, my gratitude goes to the authors and researcher who showed interest in the issue, though not all of their work could be included. A special thank is addressed to all the reviewers, whose hidden work is functional to the achievement of high standards. Dr. Rizwan Irshad had a fundamental role in the conception of the special issue, dissemination of the call, interface with the authors and coordination with the editorial office. The assistant editors, Dr. Sabina Susmel from the University of Udine, Italy, Dr. Ewa Kawalska from Hokkaido University, Japan and Dr. Hynd Remita, from the University of Paris-Sud, France are gratefully acknowledge for their time and expertise in handling the manuscripts and targeting the experts in the different fields. Last, but not least, the present issue would have not been possible without the support of Prof. Dr. Ahmed Hamid Alghamidi, Editor-in-Chief.

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