Editorial

Magnetic Interfaces at the Nanoscale: From Fundamentals to Technological Applications

M. Angelakeris,¹ O. Crisan,² and C. Martinez-Boubeta³

¹Department of Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece

²National Institute for Materials Physics, Bucharest, Romania

³Department of Electronics, University of Barcelona, Barcelona, Spain

Correspondence should be addressed to M. Angelakeris, angelaker@auth.gr

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One of the most widely researched topics over the last decades has been magnetic nanoscale systems, but recent breakthroughs in high-resolution imaging techniques in modern computing and electronics towards continuously smaller devices have nourished a booming in the quest for new materials and their novel applications. It is unambiguous that the interest for tailor-made and properly functionalized particles is very wide and expected results will be of enormous benefit for the global economy. Still, researchers should improve the manufacture of nanomaterials on a larger scale at a lower cost. In nanotechnology, methods to produce some desired structure must satisfy certain conditions, such as *speed*, *performance*, and *precision*. Although computer modelling may provide a hint in finding a structure that minimizes the internal energy, control of nanoscale phenomena in real time remains a puzzle in most cases. In this regard, even if certain prerequisites should be fulfilled for specific applications, magnetic nanoscale systems exploitation lays in the control of their interface properties.

Nanomagnets may enter in the production of almost every product we use, as standard magnets do. Among them, magnetic nanoparticles deserve special attention because of their extended applicability not only for data storage and nanoscale spintronics applications but also for healthcare. Medical researchers are actively seeking to develop improved tools for diagnosis (gene sequencing, high contrast agents for imaging) and new therapies such as hyperthermia where functionalized magnetic nanoparticles may target only the tumors without harming the healthy tissues or could be used in synergy with chemotherapeutic drug delivery.

This special issue provides a carefully selected compilation of original research papers as well as review articles

in understanding and insight of magnetic properties at nanoscale interfaces. Our scientific goal was to collect articles focusing on chemical and magnetic interfaces of nanostructured materials, in determining their influences on intrinsic magnetic properties, and to trace the role of these issues in the macroscopic behavior of nanostructures.

We did our best to conduct review and editing processes according to international standards, and we believe this special issue addresses a novel emerging technology, namely the control, functionalization, and analysis of nanometer-sized magnetic materials. Eventually, it turned out that about 50% of submitted papers have been finally accepted for publication. Finally, we would like to thank all the reviewers for their prompt and substantial involvement and all the authors for the interesting and fruitful results presented in this issue and we hope that especially young scientists will benefit from this multidisciplinary special issue, which is relevant to various up-to-date and future nanotechnologies.

M. Angelakeris
O. Crisan
C. Martinez-Boubeta