Foreword to the Special Issue on Nanofabrication, Atomic and Close-to-atomic Scale Manufacturing

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Nanomanufacturing covers a wide range of manufacturing technologies for enabling nanoscale materials, structures, components, devices, and systems through the manipulation and control of matter at the nano-scale. This is pivotal to our economy, as nanoproducts such as nanomaterials, nanooptics, nanosensors, nanoelectronics, NEMS, etc., are becoming established in major areas of our daily lives and can already be found across a broad spectrum of application areas, especially in sectors such as autos, appliances, electronics, photonics, food, healthcare, and fitness.

At present, the continuous rapid shrinking of feature size for nanoproducts has encouraged engineers and designers to seek alternative nanofabrication patterning methods, as conventional photolithography comes with inherent intrinsic resolution limits. In this regard, some promising nanofabrication techniques including extreme ultraviolet lithography, electron beam lithography, and nanoimprint lithography have been proposed as next-generation lithography (NGL), which has the potential to achieve both high-volume production and very high resolution.

Meanwhile, some subtractive ultra-precision machining and high energy beam machining technologies, additive manufacturing technologies such as atomic layer deposition, and direct self-assembly and transformative manufacturing technologies such as STM atomic manipulation and hydrogen-resist lithography, etc., are striving to achieve atomic-scale precision but also to remove, add, or transform

advanced materials at the atomic and close-to-atomic scale, i.e., towards atomic and close-to-atomic scale manufacturing (ACSM).

This special issue of *Nanomanufacturing and Metrology*, entitled “Nanofabrication, Atomic and Close-to-atomic Scale Manufacturing”, collects four original research papers, one communication, and one review article that update the latest developments in nanofabrication and ACSM including a critical review of the state-of-the-art atomic layer removal methods using atomic force microscopy and novel research and development of diamond grooving for high-resolution structural color images, fabrication of PMMA-based micromask sphere for sub-wavelength photolithography, photo-luminescence and Raman spectroscopy study of ion-implanted materials, remote absolute roll-angle measurement, and on-line measurement of ball standards.

We would like to take this opportunity to thank all the contributing authors for their great efforts in presenting their excellent research work for this special issue. Our appreciation also goes to all the reviewing experts who have provided timely invaluable comments and suggestions for the further improvement of the quality of the research papers. The tremendous support from the editorial staff of *Nanomanufacturing and Metrology* is also highly appreciated.

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