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FOREWORD

Foreword to the Special Issue on SPM-Based Nanofabrication: Machining, Electrochemistry, and Lithography

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Scanning probe microscopy (SPM) and atomic force microscopy (AFM) are widely used for surface imaging and characterization, combining nano- to atomic-scale precision with highly sensitive force measurements. Thus, AFM is considered an enabling technology, impacting many scientific fields, including life and materials sciences. In addition to mapping interaction forces, AFM can be used for the precise application of forces (controlling both location and magnitude), in combination with the application of electrical bias and controlled environments. Moreover, when combined with advances in nanoscale probe technology, SPM-based nanofabrication enables state-of-the-art nanomanufacturing at interfaces.

Furthermore, SPM-based nanofabrication covers a wide range of techniques, including the selective deposition, growth, manipulation, and removal of a range of materials at the nanoscale level from interfaces. SPM-based lithographic methods have been applied to single-atom manipulations and may usher in a new age for precision manufacturing and locally engineered functionality. These techniques are becoming increasingly important given the significance of nanoscale manufacturing in the global economy as nanotechnology becomes more established in our daily life. Moreover, they are potential candidates for atomic and close-to-atomic-scale manufacturing (ACSM), which is the leading technology in Manufacturing III.

This special issue of *Nanomanufacturing and Metrology*, titled "SPM-Based Nanofabrication: Machining, Electrochemistry, and Lithography," features one critical review article on tip-based nanomachining of thin films and six original research papers, which describes the latest developments in SPM-based nanofabrication experiments and simulations, including the lithography of 2D material surfaces, application of nanoscratching to microelectronic and plasmonic materials, and nanolithographic investigations of ferroelectric materials and oxide heterostructure cross sections.

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