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Editorial

Development of Thin Film Fabrication Using Magnetron Sputtering

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Due to their versatility, thin metal films are being used in many modern technologies, such as optoelectronics, microelectronics, catalysis, energy conversion and storage, sensors, actuators, and food packaging. Also, thin metal nanofilms have the potential to be used in applications relevant to other fields, such as bio- and nanopore sensors, nanomedicine, and voltage-charging separations. For example, thin metal films, especially of Au, Ag, and Cu, have recently gained a lot of interest due to their scientific and technological applications in the field of optics, such as perfect lenses, optical cloaking devices, surface-enhanced Raman scattering (SERS), electronics, including transparent conductive coatings, transparent electrodes for "smart windows" and solar cells, catalytic coatings, and nanomedicine, with potential applications in surface plasmon resonance (SPR)-based biosensors, antibacterial coatings [1], etc. In addition, electrodeposited reversible metal thin films used for dynamically regulating infrared radiation can be employed in adaptive thermal camouflage, smart thermal management, and dynamic information displays [2]. Also, as a semi-transparent thin film in a wide spectral range, thin metal nanofilms open more possibilities for manufacturing tunable optics for the creation of coatings with sophisticated spectral performance. With a very small change in film thickness, the optical properties of ultrathin metal films can be easily tuned and significantly changed. A potential drawback in the utilization of ultrathin transparent conductive thin metal films is their fast degradation due to environmental agents such as moisture, air gases, and temperature variation [3]. Thin metal film-based transparent conductors have additionally received great attention for their high electrical conductivity, optical transmittance with low haze, and excellent mechanical flexibility. Moreover, thin metal films exhibit unique advantages, including simple fabrication steps, low cost, and process compatibility suitable for large-area device applications [4]. Metal films can be used as electrodes for the high-temperature (HT) surface acoustic wave (SAW) sensors that can be used for wireless sensing of temperature, pressure, and detection of gases in turbine rotors, furnaces, ovens, etc., without any batteries or high sources of energy [5]. Ultra-thin metal films or metal mesh films can be used as electromagnetic interference shielding materials. Their transparency can improve their ability to achieve high-quality detection and imaging and can provide efficient protection against microwave radiation [6]. They have received much attention as transparent EMI shielding materials. While most research on transparent EMI shielding materials is focused on infrared electromagnetic shielding windows that are used in infrared optoelectronic systems in the military, aerospace, and other fields, this approach highlights the need for the development of infrared-transparent electromagnetic shielding materials [6]. Metallic nano- and micro-structures are used in biological applications. They have been used in enzyme-free glucose detection and utilized as the surface substrates of self-assembled molecular films [7,8]. They have also been used to produce the capacitance switch of radio frequency microelectromechanical systems (RF MEMS), which is commonly used for ferroelectric electrodes and high dielectric components, or electrodes for human-machine interfaces, electronic skins, and flexible displays [9–12]. In enabling thin metal films for these applications, the uniformity, grain size, morphology, and porosity of thin metal films

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play critical roles. It is well known that the process used for the deposition of the metallic film plays a critical role in the specifications of the coated metallic film. In these applications, the thin metal films are prepared by various methods. Among the metallic coating methods, sputtering has attracted much attention today [13,14]. The journal Metal aimed to publish a special issue about sputtered metallic films. In this issue, we are looking for a manuscript that covers the following topics:

- Granular metallic films for superconductivity
- Thin metallic films for catalytic applications
- Ultra-thin metallic films for optical transparency
- Thin metal films for tunable optical mirrors

This issue provides an excellent opportunity to review the previously unaddressed aspects and propose and develop new approaches.

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