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Advances in Thin Films Materials: Properties, Characterization, Physical Vapor Deposition and Application

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Message from the Guest Editors

Dear Colleagues,

The mechanical and functional properties of thin-film materials generally differ substantially from those of their bulk counterparts due to the well-known defect, strain, dimensional and interface effects. For example, thin-film materials have higher strength and wear resistance, owing to the presence of nano-sized interfaces. Additionally, interface-related strains can induce strong interplays between the crystal lattice, orbital, charge and spin degrees of freedom, which create emerging electronic or magnetic states and consequently lead to novel functionalities. These unique properties enable an incredible expansion of technological applications of thin-film materials in a range of fields, from electronics to biomedicine to optical devices. Recent advances in physical vapor deposition (PVD) have furthered the compositional and structural design of thin films. Introducing structural/compositional complexity during PVD involves profuse interface and phase coupling, and thereby significantly enhances thin films' properties.





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Message from the Editor-in-Chief

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