Properties of Interfaced Materials and Films: Part I

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Nature plays a significant role in the evolution of surfaces and interfaces in solids. Corrosion of metals¹ is one such example. Interfaces are ubiquitous in almost all engineered materials² and devices^{3,4} and have been known to affect the properties of interfaced materials and films.⁵ While the study of solid–solid interfaces represents an important and diverse area of research in materials science and engineering,⁶ the understanding and control⁷ of interfacial morphology are critical in a number of applications including nanotechnology and energy.^{8,9}

Recent advancements in electronics and photonics have led to an evolution in bandgap-engineered structures as well as the choice of material candidates.¹⁰ While these structures utilize a variety of semiconductors, interfacial stress becomes an inherent issue.¹¹ Methods that address interfacial stress and the associated strain¹² as well as the chemistry,¹³ thermodynamics¹⁴ and roughness¹⁵ have been illustrated in a number of studies in the literature.

In general, processes such as annealing, diffusion, ion implantation, oxidation and thin/thick film deposition techniques/epitaxy are some of the methods that lead to stress/strain in solid–solid interfaces. Examples of well-studied solid–solid interfaces in the literature include Si–SiO₂^{16,17} and Ge–Si.^{18,19} Recent developments in the bandgap engineering of strained monolayer and bilayer 2D materials²⁰ make the study of interfaces and films even more interesting and challenging.

To read or download any of the papers, follow the URL <http://link.springer.com/journal/11837/71/10/page/1> to the table of contents page for the October 2019 issue (vol. 71, no. 10). The second part of the

focused topic of *JOM*, Properties of Interfaced Materials and Films: Part II, will be published in December 2019.

- “Antibacterial Silver Nanoparticles Supported on Graphene Oxide with Reduced Cytotoxicity” by Carolina Angulo-Pineda, Patricia Palma, Julian Bejarano, Ana Riveros, Marcelo Kogan, and Humberto Palza.
- “A ‘Press and Go’ Thin Biofuel Cell Patch for Power Generation” by Biao Leng, Kavya Vanamamulai, Qin Zhong, Iqbal Sherif, Nuggehalli M. Ravindra, and Zafar Iqbal.
- “Effect of Interface Structure on the Hydrophobicity, Mechanical and Optical Properties of HfO₂/Mo/HfO₂ Multilayer Films” by P. Dubey, Anil K. Battu, V. Shutthanandan, and C.V. Ramana.
- “Optical and Electrical Properties of Transparent Conductive NTTO/Cu/NTTO Multilayer Films Deposited by Magnetron Sputtering” by Uang Liu, Siming Zhu, and Baokun Song.
- “Nitrogen Incorporation Induced Soft-to-Hard Transition Observed in the Mechanical Properties of Amorphous Niobium Oxide Films” by C. Orozco, O. R. Nunez, N. R. Murphy, J.G. Jones, and C.V. Ramana.
- “Strain Rate Sensitivity of the Nanoindentation Creep of Ag, Cu, & Ni Thin Films” by Y. S. Mohammed, D.S. Stone, and A.A. Elmustafa.
- “Comparative Study on the Oxidation Behavior of Austenitic and Ferritic Heat-Resistant Stainless Steels at High Temperatures” by Yuqing Zhou, Dening Zou, Yang Pang, Tongyu Wei, Wei Zhang, Yingbo Zhang, Libo Tong, Xiang Lv, and WanWan Chen.

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