Editorial

Surface Nanoscience

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Surface science has been always a matter of nanoscience even before the beginning of nanotechnology in modern science. Dealing with physics and chemistry of surfaces in materials science is the platform for engineers and scientists to play in nanometer scale. Surface science changes the scale of scientific research from micrometers to nanometers and makes the nanotechnology more complete. The surface analyses of semiconductors and metals are of interest for basic research and technological applications. The surface dependent phenomenon, which occur due to the modifications in the surface states of materials extend the applicability of the materials. The surface science became very much interesting in the present nanotechnology era. In present scenario, the application of materials is dominantly determined by its surface behavior because of the high surface-to-volume ratio in the nanomaterials. Clearly, surface nanoscience has immense potential to declare the utility of materials for various applications.

This special issue of the Journal of Nanomaterials is dedicated to basic and applied surface science for nanomaterials. It has 6 articles from different fields of materials science in nanoscale. Scanning probe microscopy, which is the most important topic for surface scientists, is discussed in an article written by Gangopadhyay et al. The authors have studied the shape of field-induced nanostructures formed by scanning tunneling microscopy and discussed the formation mechanism of nanostructures.

Surface chemistry, with electrochemical techniques, has also been covered in the present issue. In the article written by Kumar and Malhotra, they have studied the switchable mirrors and presented the effect of current density on thermodynamic properties of nanocrystalline palladium capped samarium hydride thin film switchable mirrors. They conclude that the nanocrystalline Pd capped Sm films can be reversibly switched between the metallic reflecting dihydride

state to semiconducting transparent nearly trihydride state by loading/deloading of hydrogen.

Gas sensing behavior, with surface area dependence, is discussed in two papers. The article written by Joshi and Kruis shows the distinction between size effect and specific surface area effect in the ethanol gas sensing behavior of $\text{SnO}_{1.8}$: Ag nanoparticle films and gives evidence of the dominance of size effect of the metal dopant over the surface area effect in the gas sensing of the films. The authors have also demonstrated the use of $\text{SnO}_{1.8}$: Ag for CH_4 and CO detection. In the article written by Singh et al., the authors have made correlation between optical absorption analysis and gas sensing properties of In_2O_3 : Ag nanoparticle layers.

One very interesting article by Zhao et al., discusses the synthesis and application of carbon nanotubes, which is a topic of prime interest at present. The authors report the synthesis of single-walled carbon nanotubes by modified arc discharging furnace using Fe-Ni-Mg powders as catalyst.

Effect of etching parameter on pore size and porosity of electrochemically formed nanoporous silicon is presented in an article by Kumar and Huber. This article is very useful for the scientists working in the field of porous silicon.

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