OMICS International
conferenceseries.com

J Nanomed Nanotechnol 2015, 6:4
http://dx.doi.org/10.4172/2157-7439.S1.022

# Nanotechnology Congress & Expo

## August 11-13, 2015 Frankfurt, Germany

### Synthesis, characterization and pentavalent arsenic sorption capacity of cerium aluminium nanostructured mixed oxide

**Sayan Bhattacharya**[1, 2], **Kaushik Gupta**[1] and **Uday Chand Ghosh**[1]
[1]Presidency University, India
[2]Rabindra Bharati University, India

Arsenic is a metalloid of great environmental concern because of its highly toxic nature and colossal abundance. For the mitigation of arsenic contamination, several technologies such as oxidation–precipitation, coagulation, precipitation, membrane filtration, surface sorption and ion exchange have been applied for the treatment of the contaminated water. Among them, the surface sorption method has been accepted well for its simple operation procedure, low recurring cost, very high removal efficiency, and little by-products. The objective of the present study was the synthesis and characterization of nano-structured cerium aluminium mixed oxide and its arsenic(V) sorption behavior from the aqueous solution. Two solutions of ammonium ceric nitrate and aluminium chloride were mixed in 1:1 mole proportions and the material was prepared by the method of chemical precipitation. The material was characterized in Scanning Electron Microscope, Field Emission Scanning Electron Microscope, Transmission Electron Microscope, Atomic Force Microscope, X Ray Diffraction, Fourier transform infrared spectroscopic analysis and Raman Spectra analysis. Batch method was used for the As(V) sorption kinetics. The isotherm experiments were conducted separately at temperatures 288K, 303K, 318K at pH 7.0 (±0.2) by batch sorption procedure. The oxide surface was rough and crystalline in nature. From the TEM analysis, it was found that the material was agglomeration of particles of 40–90 nm. The presence of nanoparticles in TEM image could indicate high surface to volume ratio of the material, which can be useful for adsorption purpose. In the study of kinetics of arsenic(V) sorption, the sorption percentage remained almost unchanged upto pH=9.0. After that a small decrease in sorption percentage was observed. The equilibrium data were analyzed by the Langmuir and the Freundlich isotherm models, which are usually used to describe the equilibrium sorption data. It was found that the Langmuir model was the best fit model for the sorption reaction. The Ce-Al binary oxide was very much effective in removing As(V) from water within wide range of pH. The monolayer sorption capacity of the binary oxide was quite comparable to the other As(V) adsorbents reported previously. Thus the present oxide could easily be utilized as a sorbent for arsenic removal from arsenic contaminated ground water.

sayan.evs@gmail.com

### Flexible PDLC film with graphene transparent electrodes for curved smart windows

**Yongho Seo and Yura Kim**
Sejong University, Korea

A flexible Polymer dispersed liquid crystal (PDLC) film with graphene layers as transparent electrodes was fabricated by combining a UV curable polymer and a nematic liquid crystal. The PDLC film with a dimension of 5 x 10 cm2 was flexible and operated normally with no damage when it was bent with a radius of 2 mm. Instead of using conventional transparent conducting film, the single-layer-graphene transferred on PET film was used as transparent electrodes. The thickness of the graphene-PDLC was about 210 to 220 μm. The single-layer-graphene grown by thermal chemical vapor deposition was transferred onto the PET film, and its sheet resistance was about 1.2 kΩ/sq. The controllable transmission range between the on and off states was about 60% in the visible range. The response time for the turn-on and off processes were estimated to be 0.3 and 32 ms, respectively. This successful fabrication of graphene based PDLC is a crucial step toward paving the way for the commercialization of the emerging material, graphene.

yseo@sejong.edu