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Abstract

Study of Si-SiO_2 nanocomposites using Raman spectroscopy/mapping

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Abstract:

In order to increase the capacity of hydrogen storage of the porous silicon and the specific surface area, we prepared different type of porous silicon: nanoporous and mesoporous silicon by using electrochemical anodization. After that, we investigated this layers by: SEM microscopy, SIMS spectrometry, contact angle, cyclic voltamme-try, electrochemical spectroscopy (EIS) and charge / discharge galvanostatic. The SIMS profiles at depth performed on PS layers before and after thehydrogen sorption show the increase of hydrogen concentration from 3.5x1020 atm / cm3 to6.8x1021 atm / cm3 which confirms the sorption and the storage of H + ions in the anode(PS). The measured discharge capacity is of the order of 477 mAh /g with a coulompicefficiency of the order of 94% for the nanoporous silicon which confirms that this material iscould be a promising candidate for the storage of hydrogen.

Biography:

Ekta Rani is currently working as a researcher in NANOMO, Faculty of Science, University of Oulu, Finland with research interests including soft lithography, spectroscopy, and microscopy for nanofabrication and associated applications. She completed her BSc and MSc degrees at Panjab University, India in 2008 and 2010, respectively. Subsequently, she joined the Raja Ramanna Centre, India for Advanced technology to carry out studies on semiconductor nanocomposites for her PhD with Prof. Alka A. Ingale. In 2016 she joined the Manchester Institute of Biotechnology (MIB), University of Manchester, UK as a postdoctoral research associate with Dr. Lu Shin Wong and Prof. Royston Goodacre, researching the development of scanning probe lithography-based bio–sensors. In 2019, she joined the Department of Physics, Central University of Punjab, India as an assistant professor.

Recent Publications:

1. Ekta Rani et al; Interaction between CdS nanocrystals and PVP leading to co-operative growth of CdS-PVP nanocomposites: A Raman and AFM mapping study, 2017.
2. Ekta Rani et al; Band gap tuning in Si-SiO 2 nanocomposite: Interplay of confinement effect and surface/interface bonding, 2017
3. Ekta Rani et al; Corroboration of Raman and AFM mapping to study Si nanocrystals embedded in SiO2, 2016.
4. Ekta Rani et al; Resonance Raman mapping as a tool to monitor and manipulate Si nanocrystals in Si-SiO2 nanocomposite, 2015.
5. Ekta Rani et al; Insight into co-operative growth of nearly monodispersive CdS nanocrystals embedded in polyvinyl pyrrolidone, 2015.

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