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Nanoscale Silicon Particles in Sandwich Structures Fabricated on Silica Wafers: HRTEM and EDX Techniques as Imaging Tools PAVAN SINGARAJU, KRISTINA E. LIPINSKA-KALITA, Department of Electrical and Computer Engineering, University of Nevada Las Vegas, THOMAS HARTMANN, LONGZHOU MA , Harry Reid Center for Environmental Studies, University of Nevada Las Vegas, BISWAJIT DAS, Department of Electrical and Computer Engineering, University of Nevada Las Vegas — The use of silicon in optical applications is limited by its small and indirect band gap. However, recent observations of photoluminescence in porous Si and in Si ultra fine particles suggest that Si nanoclusters may become a promising material for optical applications. The nanometric Si clusters have a band gap enlarged into the visible range and quantum confinement effect is believed to be the mechanism for light emission. The ability to control the size and structure of nanoparticles would allow the fabrication of structures with desired electrical and optoelectronic properties for device applications. Nanosized Si particles with controlled diameter were fabricated on silica substrate wafers using an specially designed ultra-high vacuum nanocluster deposition apparatus. We present the structural characterization and composition studies of the fabricated nanostructures using high resolution transmission electron microcopy (HRTEM), x-ray diffraction (XRD) and energy dispersive x-ray (EDX).

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