



Contribution ID: 193

Type: **not specified**

Synthesis, Opto-structural and Electrical Characterisations of Nd₂O₃-coated Silicon Nanoparticles

Monday, 18 November 2024 16:30 (15 minutes)

Silicon nanoparticles of 2-10 nm size (Si-np) embedded into silicon nitride (Si₃N₄) thin films (70 nm thick) were synthesized and deposited on polycrystalline silicon wafers through plasma enhanced chemical vapour deposition (PECVD) technique using ammonia (NH₃) and silane (SiH₄) as precursor reacting gases. A second layer (50 nm) consisting of rare-earth neodymium oxide (Nd₂O₃) was added onto the Si-np by thermal evaporation. The resulting samples consisting of bilayered coating on Si substrate were assumed to possess photoluminescent properties where Nd₂O₃ and Si-np elements “cooperate” to emit a stronger signal. The occurrence on the wafer’s surface of Si-np differing in size and the formation of the Nd₂O₃ layer were supported by atomic force microscopy (AFM) and scanning electron microscopy (SEM). Chemical composition characterisation was done by X-ray photoelectron spectroscopy (XPS) and energy dispersive x-ray spectroscopy (EDS). The devices were finalised by screen-printing the contacts (Ag-Al) on the front face and Al on the rear. Electrical measurements by Hall effect and spectral response were carried out to determine carrier concentrations, mobility of the charge carriers and efficiency of the obtained solar cells.

Primary authors: MEFOUED, Amine (Centre de Recherche en Technologie des Semi-conducteurs pour l’Energétique (CRTSE)); Dr BEKHEDDA, Kheira (Centre de Recherche en Technologie des Semi-conducteurs pour l’Energétique (CRTSE)); Prof. BENREKAA, Nasser (Université des Sciences et de la Technologie Houari Boumediene); Prof. MAHMOUDI, Bedra (Retired); Dr KHELIFATI, Nabil (Centre de Recherche en Technologie des Semi-conducteurs pour l’Energétique (CRTSE))

Presenter: MEFOUED, Amine (Centre de Recherche en Technologie des Semi-conducteurs pour l’Energétique (CRTSE))

Session Classification: AfPS Contribution

Track Classification: AfPS