



Contribution ID: 128

Type: Oral Presentation

Dual-Site Loading and Characterization of Cobalt Ferrite Nanostructures

Friday, 7 July 2023 11:20 (20 minutes)

Dual-site loaded cobalt-ferrite spinel nanostructures with chemical formula $\text{Co}_{1-2x}\text{Ni}_x\text{Mn}_x\text{Fe}_{2-y}\text{Ce}_y\text{O}_4$, where $0 \leq x = y \leq 0.3$, were successfully prepared via glycolthermal route. The final products of the appropriate sites loading are CoFe_2O_4 (dried naturally), CoFe_2O_4 (dried with Infrared lamp), $\text{Co}_{0.8}\text{Ni}_{0.1}\text{Mn}_{0.1}\text{Fe}_{1.9}\text{Ce}_{0.1}\text{O}_4$, $\text{Co}_{0.6}\text{Ni}_{0.2}\text{Mn}_{0.2}\text{Fe}_{1.8}\text{Ce}_{0.2}\text{O}_4$, and $\text{Co}_{0.4}\text{Ni}_{0.3}\text{Mn}_{0.3}\text{Fe}_{1.9}\text{Ce}_{0.3}\text{O}_4$. The structure, surface morphology, surface area, elemental composition and optical analysis were carried out by X-ray diffraction (XRD) and high resolution transmission electron microscopy (HRTEM), scanning electron microscopy (SEM), Brunauer-Emmett-Teller (BET), X-ray photoelectron spectroscopy (XPS), and UV-vis spectroscopy (UV). XRD results showed the cubic crystal structure and spinel formation of the samples; HRTEM confirms the crystallinity of the samples. SEM revealed the nano-spherical nature of the samples. BET results showed that the samples are mesoporous. The presence of the constituent elements of the $\text{Co}_{1-2x}\text{Ni}_x\text{Mn}_x\text{Fe}_{2-y}\text{Ce}_y\text{O}_4$ spinel was verified by XPS. The band gaps of the samples estimated from the Tauc plot were found to be between 1.88 and 2.55 eV.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

Primary author: Mr OGUNDIPE , Sunday (University of Zululand)

Co-authors: Mr CEBEKHULU, Ntokozo (University of Zululand); Dr NKOSI, Solethu (University of Limpopo); Prof. REVAPRASADU, Neerish (University of Zululand); Dr NDLANGAMANDLA, Ceboliyazakha (University of Zululand)

Presenter: Mr OGUNDIPE , Sunday (University of Zululand)

Session Classification: Physics of Condensed Matter and Materials Track 1

Track Classification: Track A - Physics of Condensed Matter and Materials