Contribution ID: **360** Type: **Poster**

SYNTHESIS AND CHARACTERIZATION OF HOLLOW Co Fe2 O4 MICROSPHERES WITH POTENTIAL APPLICATION IN ENERGY HARVESTING

Energy harvesting technologies have attracted considerable attention today. Various nano or microgenerators based on piezoelectric, triboelectric, and electromagnetic effects are becoming popular to design and realize many self-powered applications (1). Electromagnetic generators (EMG) offer numerous advantages, including possible architectures and nanostructured materials for device fabrication.
In this work, the synthesis of hollow CoFe2O4 microspheres was carried out using carbon microspheres as sacrificial structures. The synthesis was carried out in three steps. The first step is the hydrothermal synthesis of carbon microspheres from anhydrous dextrose, and the second step is the incorporation of the precursor salts of cobalt ferrite (2Fe(NO3)3·9H2O + Co(NO3)2·6H2O) in the presence of the carbon microspheres subjected to a solvothermal method for 15 hours with a controlled temperature of 150 ◦C, finally, the hollow microsphere is obtained from the calcination of the sacrificial structure in a muffle with a heating ramp of 1 ℃/min until reaching 500 ℃. The temperature is maintained for 4 h. The morphological characterization of the microsphere was done by scanning electron microscopy (SEM), observing spheres with average diameters of 4 µm, consistent with the sizes of the sacrificial structures. Regarding the magnetic nature of the cobalt ferrite microspheres, a remanent magnetization of 2.85x10-3 emu and a coercivity of 32.5 Oe were achieved, typical values of a ferromagnetic material.

Keywords

Co Fe2 O4, energy harvesting, hollow microspheres, synthesis, characterization

Reference

(1) Oh, Y., Sahu, M., Hajra, S. et al. Spinel Ferrites (CoFe2O4): Synthesis, Magnetic Properties, and Electromagnetic Generator for Vibration Energy Harvesting. J. Electron. Mater. 51, 1933–1939 (2022). https://doi.org/10.1007/s11664-022-09551-5

This work was supported by

Proyecto: CBF 2023-2024-4069, CONAHCYT Ciencia Básica y de Frontera 2023-2024

Author approval

I confirm

Author will attend

I confirm

Author: Dr GALLARDO VEGA, Carlos Alberto (Centro de Investigación en Química Aplicada)

Co-authors: Dr LEDEZMA PÉREZ, Antonio Serguei (Centro de Investigación en Química Aplicada); Dr DE LEÓN SANTILLÁN, Arxel (Centro de Investigación en Química Aplicada); ALVARADO CANCHE, Carmen Natividad (Centro de Investigación en Química Aplicada); ANAYA ZAVALETA, Juan Carlos (Centro de Investigación en Química Aplicada)

Presenter: Dr GALLARDO VEGA, Carlos Alberto (Centro de Investigación en Química Aplicada)

Session Classification: RENEWABLE ENERGY

Track Classification: Renewable Energy: Materials and Devices