SYNTHESIS OF NICKEL HYDROXIDE BY MICROWAVE-ASSISTED HYDROTHERMAL REACTION.
Angel David Samos Puerto¹, Geonel Rodríguez Gattorno¹, Miguel Ruiz Gómez²
¹CINVESTAV-Mérida, Department of Applied Physics, Mexico. ²Cátedras-CONACyT-CINVESTAV Mérida, Department of Applied Physics, Mexico.

Nickel hydroxide (Ni(OH)₂) is one of the most important transition metal hydroxide with potential applications in areas related to energy storage devices such as batteries, supercapacitors, and recently for photocatalytic hydrogen production splitting of water. On the other hand, the use of microwave irradiation during hydrothermal synthesis is an attractive option because of its high efficiency and homogeneous heating. In this regard, microwave-hydrothermal method shows advantages principally related to short time and low reaction temperature in comparison to conventional hydrothermal. For these reasons, in this work is reported the use of microwave-assisted hydrothermal method for synthesizing Ni(OH)₂ under different temperatures (100, 130 and 160°C) and urea proportion (1, 2 and 3 millimol). The obtained green powders were characterized by several physicochemical techniques. According to the results, the samples present a micrometric 3D flower-like morphology formed by well-defined nanosheets, where the amount of urea used in reaction plays an important role on the particles homogeneity. The thickness of the sheets observed by SEM showed a value less than 50 nm. On the other hand, the as-prepared powders are crystalline compounds, the pure α-phase was obtained at 100 and 130°C; whereas both phases α- and β-Ni(OH)₂ crystallized at 160°C, where the amount of urea has an influence on crystallinity and proportion of α- and β-phases.

Keywords: Nickel hydroxide, green-chemistry, hydrothermal-microwave

Acknowledgment:
The authors acknowledge CONACYT for supporting A.D. Samos-Puerto through M.Sc. Scholarship 456192 and M.A. Ruiz-Gómez through Cátedra Project 1710, CB-2015-255109, INFR-2015-252758 and SENER-CONACYT-2014-254667 “Consolidación del Laboratorio de Energía Renovable del Sureste”. The authors also are grateful for the use of the facilities of the National Laboratory for Nano and Biomaterials of Cinvestav-Mérida supported by Projects FOMIX-Yucatán 2008–108160 and CONACYT LAB-099- 01-123913.

Presenting author's email: angel.samos@cinvestav.mx