

# Synthesis and characterization of nickel nanoparticles supported on aluminum oxide

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**Abstract :** Due to their peculiar qualities, metal-based nanostructures have been extensively used in applications such as catalysis, electronics, photography, and information storage, among others. New applications for metals in areas such as photonics, sensing, imaging, and medicine are also being developed. Significantly, most of these applications require the use of metals in the form of nanostructures with specific controlled properties. The properties of nanoscale metals are determined by a set of physical parameters that include size, shape, composition, and structure. In recent years, many research fields have focused on the synthesis of nanoscale-sized metallic materials with complex shape and composition in order to optimize the optical and electrical response of devices containing metallic nanostructures. In This work, we study nickel nanoparticles supported on aluminum oxide, prepared by impregnation with ionic exchange. In a first stage, the fixing conditions of the nickel precursor on aluminum oxide are optimized. In the second stage, the samples are calcined at temperature ( $T= 750\text{ }^{\circ}\text{C}$ ). Several experimental techniques are used for the characterization of the samples at the various stages of their elaboration (SEM, DRX, and VSM). A change of morphology of the aluminum oxide grains was observed by Scanning Electron Microscope. The X-rays diffraction shows the formations of nanoparticles  $\text{Al}_3\text{Ni}_2$  of near size 16.7 nm. The extracted magnetic measurements show the good and the easy magnetization

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