

A NEW CHEMICAL ROUTE TO SYNTHESIZE Cu-Ni ALLOY NANOSTRUCTURED PARTICLES

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ABSTRACT: Cu-Ni alloys are extensively used in several metallurgic industries. The traditional methods for the synthesis of these alloys have some limitations, mainly related with manufacturing costs and product homogeneity, which makes evident the need to study and develop new methodologies to produce them. In this work a new route for the synthesis of Cu-Ni alloys is presented. The process involves four steps, including the precursor preparation by the citrate-gel method and the subsequent decomposition, calcination and reduction. The products obtained in the different steps were characterized using thermal gravimetry (TG), X-ray diffraction (XRD), infrared spectroscopy (IR), scanning electron microscopy (SEM), electron probe microanalysis (EPMA) and other techniques. The Cu-Ni alloy, of homogeneous composition, with a Cu/Ni atomic ratio of 0.92 and with a grain structure at nanometric scale was obtained using the proposed methodology. The studies carried out using SEM and XRD showed the alloy formation with a regular morphology and with an average grain size of about 15.5 nm. The thermal programmed reduction (TPR) profiles showed a unique reduction temperature for the synthesized solid, which is significantly lower than the pure oxides reduction temperature.