



ID de Contribution: 127

Type: **Poster**

Magnetic and structural properties of iron nanomaterials processing by mechanical alloying

Abstract:

Magnetic iron nanomaterials were prepared facily by mechanical alloying process. The solid-solution of Cu-50 wt% Fe and Ni-50 wt% Fe were prepared by ball milling of elemental powders up to 24 h. As-synthesized nanomaterials were characterized by means of SEM, XRD and VSM techniques. Results show as-prepared magnetic nanomaterials are sphere particles with aggregation state. It was found that the iron peaks in the XRD patterns vanish at the early stages of mechanical alloying process but the dissolution of Fe needs more milling time. Moreover, the crystallite size of the matrix decreases with increasing milling time and the crystallite size reaches a plateau with continued milling. The obvious magnetic hysteresis loops of the sample Cu-50 wt% Fe and Ni-50 wt% Fe indicate that these two samples have clear ferromagnetic characteristics.

Keywords: nanomaterials, mechanical alloying, magnetic properties, crystallite size refinement.

Choix de session parallèle

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Classification de Session: Séance Poster