Mechanochemical Synthesis of Al2O3/Mo Nanocomposite Powders from Molybdenum Oxide

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Abstract : Al2O3/Mo nanocomposite powders were successfully synthesized by mechanical milling through mechanochemical reaction between MoO3 and Al. The structural evolutions of powder particles during mechanical milling were studied by X-ray diffractometry (XRD), energy dispersive X-ray spectroscopy(EDX) and scanning electron microscopy (SEM). Results show that Al2O3-Mo was completely obtained after 5 hr of milling. The crystallite sizes of Al2O3 and Mo after milling for 20 hr were about 45 nm and 23 nm, respectively. With longer milling time, the intensities of Al2O3 and Mo peaks decreased and became broad due to the decrease in crystallite size. Morphological features of powders were influenced by the milling time. The resulting Al2O3- Mo nanocomposite powder exhibited an average particle size of 200 nm after 20 hr of milling. Also nanocomposite powder after 10 hr milling had relatively equiaxed shape with uniformly distributed Mo phase in Al2O3 matrix. **Keywords :** Al2O3/Mo, nanocomposites, mechanochemical, mechanical milling

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