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Effect Of The Cu Particle Size On The Kinetics Of A W-Cu Composite Powder Formation By High Energy Milling

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High energy milling (HEM) produces composite powders with high homogeneity and fine granulation of the phases. Fragmentation of the harder phase, deformation of the softer phase and embedding of the harder phase in the softer one are the mechanism of formation of the composite particles. HEM can also extend solid solubility and produce limited solubility in insoluble systems as well. Amorphous and nanocrystalline phases can also be obtained by HEM. This work investigates the effect of the particle size of the Cu powder on the characteristics of a W-25w%Cu powder prepared by HEM. Two different Cu powders were utilized. W and Cu powders were dry milled in a planetary mill for 100 hours. Samples were collected after 2, 25, 50 and 78 hours of milling. The evolution of the particles during milling was investigated by XRD, SEM and EDS. During milling, shape, size and composition of the particles change significantly. The high milling intensity used in this work was able to produce composite particles, but amorphization of neither phases was observed. The crystal structure of finer Cu powder is more severely deformed than that of the coarser powder.