

Synthesis and Characterization of High Entropy Alloys AlCrCuFeZnNbx (x = 0, 0.5, 1) by Mechanical Alloying

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AlCrCuFeZnNbx (x = 0, 0.5, 1) multi-component high entropy alloys were synthesized by mechanical alloying (MA). Alloying behavior, microstructure and microhardness were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM) and Vickers microhardness test, respectively. Two BCC phases were observed after MA of alloys AlCrCuFeZn and AlCrCuFeZnNb0.5, while one BCC phase and an amorphous phase were found in AlCrCuFeZnNb alloy. DRX analysis with in situ heating and differential scanning calorimetry (DSC) analysis showed that the phases obtained by MA were stable until 570°C. The microhardness increased with Nb content, with values of 650HV for AlCrCuFeZn and 690HV for AlCrCuFeZnNb.