

عنوان مقاله:

Study of deformation microstructure of nickel samples at very short milling times: effects of addition of $\alpha\text{-Al}_2\text{O}_3$ particles

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خلاصه مقاله:

Abstract Deformation microstructure of pure Ni powder milled for short duration was studied. The microstructure, as obtained on the basis of Rietveld analysis and microstructural modeling, shows inhomogeneity and consists of 'heavily deformed' with twin faults probability and 'slightly deformed' components with varying dislocation densities. The modified Williamson–Hall analysis was performed for both the subcomponents with the relevant scaling parameter. Attempts were made to elucidate the nature of dislocation present in the milled samples. The correction due to extra broadening from stacking fault was calculated from the refined values of twin fault probability. In-depth microstructural modeling with restrictedly random distribution of dislocation and a lognormal distribution of spherical particles were done for the two subcomponents to explore the inhomogeneous microstructure. The effect of $\alpha\text{-Al}_2\text{O}_3$ addition is found in reduction in the Ni particle size and yielding more uniform size distribution. It is shown that X-ray line profile analysis is capable of modeling such inhomogeneous microstructure.

کلمات کلیدی:

CO, milled Ni powder, x, ray powder diffraction, Rietveld analysis, Twin fault, Microstructural modeling

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