

Plastic straining and concomitant microstructure recrystallization of Ni-Cu alloy in the undercooled condition

ABSTRACT

Microstructure and microtexture of rapidly solidified undercooled Ni-Cu alloys were investigated. The characteristic undercooling of Ni₈₀Cu₂₀ alloy was determined as 45K, 90K and 160K. Dendrite deformation due to rapid solidification led to strong deformation microtexture. Due to recrystallization upon annealing after recalescence, many subgrains were formed in the microstructure. Further, annealing the quenched alloy at 900°C, new microtextures and subgrains were formed, which was due to recrystallization and dislocation network rearrangement. The results of comparative experiment proved the recrystallization mechanism of the microstructure refinement in the non-equilibrium solidification structure of the undercooled binary alloy.