

Cellular Automata Modelling of Titanium Alloy

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Abstract : The alpha-beta Titanium alloy (Ti-6Al-4V) is the most common alloy in the aerospace industry. The hot workability of Ti-6Al-4V has been investigated by means of hot compression tests carried out in the 750-950 °C temperature range and 0.001-10s⁻¹ strain rate range. Stress-strain plot obtained from the Gleeble 3800 test results show the dynamic recrystallization at temperature 950 °C. The effect of microstructural characteristics of the deformed specimens have been studied and correlated with the test temperature, total strain and strain rate. Finite element analysis in DEFORM 2D has been carried out to see the effect of flow stress parameters in different zones of deformed sample. Dynamic recrystallization simulation based on Cellular automata has been done in DEFORM 2D to simulate the effect of hardening and recovery during DRX. Simulated results well predict the grain growth and DRX in the deformed sample.

Keywords : compression test, Cellular automata, DEFORM , DRX

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