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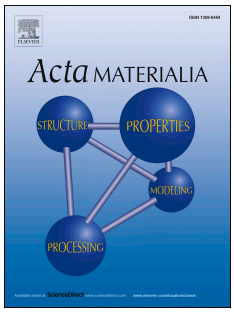

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Microstructure evolution during austenite reversion in Fe-Ni martensitic alloys

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Abstract:

The change of microstructure during reverse transformation by continuous heating and isothermal holding above A_f temperature in were studied Fe-11, 18 and 23 Ni (mass %) alloys. In-situ observation by using confocal laser scanning microscopy (CLSM) and in-situ/ex-situ electron backscatter diffraction (EBSD) analysis were used for direct observation of reverse transformation. It was found that the start temperatures (As) for austenite reversion decrease with increasing of Ni content while they are higher than T_0 temperatures. Reverse transformation in the Fe-23 Ni alloy is accompanied with a sharp surface relief indicating that reverse transformation occurs martensitically in this alloy. EBSD measurements show that reversed austenite grains in this alloy are formed with nearly identical crystallographic orientations to the prior one, which means orientations and boundaries of prior austenite grains are preserved due to the austenite memory effect. By further holding above A_f temperature spontaneous recrystallization of reverted austenite proceeds. The Fe-18 Ni alloy also shows similar microstructure change during reversion. Near Kurdjamov-Sachs (K-S) orientation relationship is

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