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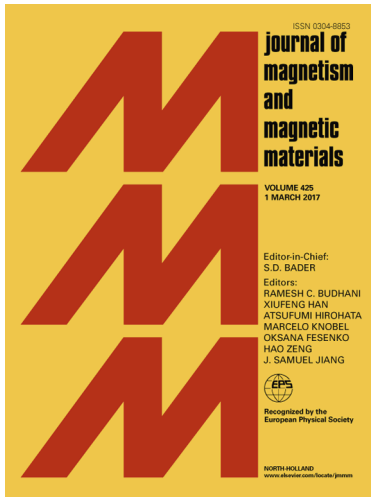

Research articles

Effect of low-melting point phases on the microstructure and properties of spark plasma sintered and hot deformed Nd-Fe-B alloys

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Effect of low-melting point phases on the microstructure and properties of spark plasma sintered and hot deformed Nd-Fe-B alloys

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Key words: Permanent magnets, microstructure, spark plasma sintering, hot deformation

Abstract: The effect of adding a low melting point Pr-Cu-Al alloy during spark plasma sintering of melt-spun Nd-Fe-B ribbons is investigated. Regions of coarse grains were reduced and overall grain refinement was observed after the addition of $Pr_{68}Cu_{25}Al_7$, leading to an enhancement of coercivity from 12.7 kOe to 20.4 kOe. Hot deformation of the samples in the spark plasma sintering system resulted in the formation of platelet-like grains, producing crystallographic alignment and magnetic anisotropy. The hot deformation process improved the remanence and energy product but reduced the coercivity. The decrease of coercivity resulted from grain growth and aggregation of Pr and Nd elements at triple-junction phases.

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