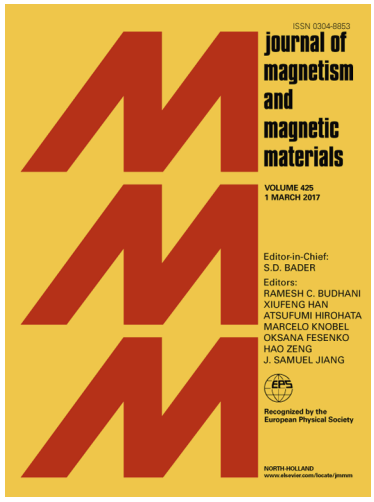

Size dependent training of exchange bias effect in $CuFe_2O_4$/CuO nanocomposites

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Size dependent training of exchange bias effect in $CuFe_2O_4$/CuO nanocomposites

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Abstract

Size dependent training of exchange bias effect in $CuFe_2O_4$/CuO nanocomposites has been investigated in this report. The analysis of coercive field versus cycle numbers predict two mechanisms (athermal effect and conventional thermal activation) exist in the training process. The athermal effect is concerned to result the abrupt decrease at first cycle, while the conventional thermal activation is responsible for the gradual reduction of the subsequent cycles. Size depends on relative change of exchange bias field (H_{EB}) and enhancement of coercivity (ΔH_C) show a nonmonotonic change. The decay rate of normalized H_{EB} and ΔH_C with field cycles are different, supporting dual behaviors of uncompensated spins at the interface. The frozen uncompensated antiferromagnetic spins are responsible for the H_{EB} reduction, while the ΔH_C change has correlation to the rotatable uncompensated antiferromagnetic spins at the FM/AFM interface.

Key words: Training effect; Size; Athermal effect; Thermal activation.