

Ferrimagnetic Properties of Bond Dilution Mixed Blume-Capel Model with Random Single-Ion Anisotropy

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Abstract: We study the ferrimagnetic properties of spin 1/2 and spin-1 systems by means of the effective field theory. The system is considered in the framework of bond dilution mixed Blume-Capel model (BCM) with random single-ion anisotropy. The investigation of phase diagrams and magnetization curves indicates the existence of induced magnetic ordering and single or multi-compensation points. Special emphasis is placed on the influence of bond dilution and random single-ion anisotropy on normal or induced magnetic ordering states and single or multi-compensation points. Normal magnetic ordering states take on new phase diagrams with increasing randomness (bond and anisotropy), while anisotropy induced magnetic ordering states are always occurrence no matter whether concentration of anisotropy is large or small. Existence and disappearance of compensation points rely strongly on bond dilution and random single-ion anisotropy. Some results have not been revealed in previous papers and predicted by Néel theory of ferrimagnetism.

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Key words: ferrimagnetic property, mixed Blume-Capel model, induced magnetic ordering, compensation point, bond dilution and random single-ion anisotropy

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