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The Magnetic Properties of Bilayer Ising Model in External Magnetic Field

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The magnetic properties of a ferromagnetic bilayer Ising system consisting of two monolayers with different spins $1/2$ - 1 and different interaction constants coupled together with an interlayer interaction are studied by using the lowest approximation of the cluster variation method. The temperature dependences of the layer and total magnetizations are investigated extensively and observed only second-order in phase transition in the case of layer spin values $1/2$. On the other hand, both the first and second-order phase transitions are observed for the spin values and on the monolayers. The effect of single-ion anisotropy (D) on the only B monolayer is also studied. The phase transitions of monolayer magnetizations are studied and the phase diagrams of the system are given in different planes. The temperature dependence of the total magnetization and the effect of the external magnetic field on all system is also examined. We find interesting magnetic properties in the system, such as tricritical point and compensation behavior, depending on the competition between the interlayer interactions and single-ion anisotropy parameter.

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