MIXED SPIN-1/2 AND SPIN-1 ISING SYSTEM AND ITS APPLICATION FOR DESCRIPTION OF MOLECULAR-BASED MAGNETS

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9.7 cm

Recently bimetallic molecular-based magnetic materials with two kinds of alternate magnetic atoms have been experimentally prepared and analysed. From the theoretical point of view these materials seem to well described in terms of the mixed spin Ising or Heisenberg models. In particular, we consider a mixed spin-1/2 and spin-1 Ising system with a special topological structure with coordination number $z = 5$. A general model consisting of two kinds of atoms (denoted A and B) is considered. The exchange parameters for the $A - A$, $B - B$ and $A - B$ bonds are assumed to be different and the crystal-field effect is also considered. The main purpose of this study is to investigate the influence of different exchange constants and crystal-field parameter on the phase diagrams within the framework of the effective-field theory. In addition, the occurrence of the tricritical behavior and first-order phase transition is also discussed.

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