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Magnetic properties and B-site cation ordering in $(Sr_{0.5}Ba_{0.5})_2FeSbO_6$ perovskite

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Abstract

We investigate the dependence of magnetic properties on the B-site cation ordering for a series of $(Sr_{0.5}Ba_{0.5})_2FeSbO_6$ double-perovskite samples for which the Fe/Sb long-range ordering ranges from nearly nonexisting to essentially complete. Also the size of crystallographically ordered domains varies among the samples. All the samples are antiferromagnetic at low temperatures independent of the level of ordering, indicating multiple co-existing exchange and/or superexchange interactions. Nevertheless, a clear trend is seen for the Néel temperature and the effective magnetic moment both increasing with increasing degree of order and the size of the ordered domains.

Keywords

double perovskite, degree of order, magnetic properties, antiferromagnetic, exchange and superexchange