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Magnetic Symmetry for Hexagonal Manganite RMO3

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Abstract content
 (Max 300 words)

We study the symmetry of hexagonal manganite RMO3 (R = Sc, Y, Ho, Er, Tm) at room temperature with non-magnetic space group P63mc and below the transition temperature TN = 7 0 ...130 K with magnetic space groups (P6'3cm, P6'3c'm, P6'3) for parallel and (P63c'm', P63cm, P63) for anti-parallel orientation in planar -triangular structures. We calculate and tabulate the irreducible representations and the co-representations of non-magnetic and magnetic space groups respectively at high symmetry points and lines throughout the fundamental domain in the Brillouin zone. These irreducible representations and co-representations are the starting point in calculations of the coupling coefficients. They are also needed for structure elucidation in X-ray, electron and neutron diffraction experiments. The coupling coefficients are used in the calculation of material tensors, like Raman scattering tensors, Brillouin scattering, morphic effects in crystals, as well as non-linear magneto-optical properties. The selection rules and wave vector selection rules for these space groups are given.

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