COOPERATIVE JAHN-TELLER EFFECT IN LOW-SYMMETRY RARE-EARTH SYSTEMS

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The cooperative Jahn-Teller effect (CJTE) has many fascinating aspects related mainly to structural phase transitions. In the CJTE-systems the driving force for the phase transition is the coupling between the lattice deformations and the electronic degrees of freedom. This coupling can be considered as an effective quadrupole-quadrupole interaction mediated by phonons.
The Jahn-Teller effect is generally quite small in rare-earth compounds presumably because of the smallness of the electron-phonon coupling. Recently we have shown that in some low-symmetry rare-earth systems this interaction is relatively strong and CJTE can be observed by means of a variety of experimental methods.
In this review the results of structural, magnetic, optical, EPR and specific heat studies of CJTE in rare-earth double tungstates and double molybdates are presented. These materials crystallize in low-symmetry structures and many of them show complicated structural and magnetic phase transitions driven by CJTE. It is shown that molecular-field approximation gives satisfactory description of both the static and dynamic behavior of these systems.

9.7 cm

13.4 cm

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