STRONG QUADRUPOLE INTERACTION AND STATIC JAHN-TELLER EFFECT IN THE EPR SPECTRUM OF Ir^{2+} IN MgO

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The EPR spectrum of Ir^{2+} was studied in single crystals of MgO at X-band in the temperature range 1.6 - 300°K. The spectrum exhibits a strong quadrupole interaction and a static Jahn-Teller effect. The electric field gradient required for the quadrupole interaction is in this case caused by the Jahn-Teller distortions. At high temperatures the spectrum is isotropic, with $g = 2.309 \pm 0.005$ at 273°K. At low temperatures the spectrum consists of a superposition of three tetragonal spectra which can be fitted to an axial spin hamiltonian. The resonance parameters at 4.2°K are: $g_{\parallel} = 1.978 \pm 0.001$, $g_{\perp} = 2.464 \pm 0.001$, $^{191}A_{\parallel} = 5.5 \pm 0.5$, $^{191}A_{\perp} = 14.7 \pm 0.5$, $^{191}Q = 32.2 \pm 0.5$, $^{193}A_{\parallel} = 6.0 \pm 0.5$, $^{193}A_{\perp} = 16.1 \pm 0.5$, $^{193}Q = 29.2 \pm 0.5$, where A and Q are in units of $10^{-4}cm^{-1}$.

MAGNETIC RESONANCE OF THIN-FILM SINGLE-CRYSTAL EPITAXIAL DILUTE ALLOYS[1]

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The magnetic resonance of thin (<1μ) Ag:Er films, epitaxially grown on cleaved NaCl (001) faces, was studied. An anisotropy associated with the thermal strain was observed. The magnitude of the anisotropy allows the extraction of the orbit-lattice coupling constant. The angular variation of the line width is ascribed to a spatial dependence of the internal strain. It was shown that systematic line width studies as a function of film thickness will permit the extraction of the explicit internal strain distribution for an epitaxially grown film.

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