INVESTIGATION OF THE B' STATE OF CaF and CaCl

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The B'$^2\Delta$ states of CaF and CaCl have been excited directly, under specific experimental conditions, through the B'$^2\Delta$-X$^2\Sigma^+$ forbidden transition, and detected by collecting the A-X or B-X fluorescence. Rotational analysis of the B'-X(0-0) band provides accurate molecular parameters in good agreement with those obtained previously by Verges et al.[a] in the case of CaF. For CaCl, the B'$^2\Delta$ state, observed for the first time lies at 19232 cm^{-1} above the ground state, in excellent agreement with its position (19319 cm^{-1}) predicted by the Ligand Field Theory. The spin-orbit coupling constant A^{SO} for CaF and CaCl are close, indicating that the molecular structure is mainly governed by the Ca$^+$ metal ion and only slightly by the ligand. Several excitation and deexcitation mechanisms, which may contribute, will be discussed.

[a] Verges, Effantin, Bernard, Toupouzkhanian, Allouche, d'Incan and Barrow, J. Phys. B., At. Mol. Opt. Phys., 26, 279-284 (1993)