

# Spectral intensities in cubic systems. II. The $\text{MoCl}_6^{3-}$ system in cubic elpasolite crystals

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The visible and near infrared luminescence spectra of  $\text{MoCl}_6^{3-}$  in  $\text{Cs}_2\text{NaMCl}_6$  ( $M=\text{Sc}, \text{Y}, \text{In}$ ) and  $\text{MoBr}_6^{3-}$  in  $\text{Cs}_2\text{NaYBr}_6$  have been reported between  $15\,000\text{ cm}^{-1}$  and  $3000\text{ cm}^{-1}$  at liquid helium temperatures. It has been observed that each electronic transition shows an extensive and rich vibronic structure, which can be analysed to yield the vibrational frequencies of the  $\text{MoX}_6^{3-}$  ion in each electronic state. A thorough analysis of the spectra for these systems, show that the vibrational frequencies associated with each of the electronic transition is almost identical. This is an evidence of a weak or rather negligible Jahn-Teller distortions. The spectra though are strongly influenced by resonant interactions among the  $\text{MoX}_6^{3-}$  ion and the internal and lattice modes of the host lattices and there is also a noticeable variation of the relative vibronic distributions of parity forbidden transitions assisted by the odd parity normal modes of vibrations. This present work deals with the most likely int