Electronic Spectra and Stability of Cobalt Halide Complexes in Molten Calcium Nitrate Tetrahydrate

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The complex formation between cobalt(II) and chloride and bromide ions in molten calcium nitrate tetrahydrate at different temperatures has been studied by a spectrophotometric technique. Addition of halide ions to cobalt(II) nitrate solution in calcium nitrate tetrahydrate caused a pronounced shift of the absorption maximum toward lower energies and a large increase of absorption intensity, indicating a change from octahedral to a tetrahedral co-ordination. The change of co-ordination depends on temperature and halide concentration. Stability constants for the \([\text{Co(NO}_3\text{)}_4]^{2-}\), \([\text{Co(NO}_3\text{)}_2\text{X}_2]^{2-}\) and \([\text{CoX}_4]^{2-}\) complexes at 40 and 70 °C and the corresponding species spectra are reported.

\textit{Key words:} Cobalt(II) Halide Complexes; Calcium Nitrate Tetrahydrate; Stability Constants.