

^{155}Gd Mössbauer Spectroscopic Study of $\text{GdM}(\text{CN})_6 \cdot 4\text{H}_2\text{O}$ ($\text{M} = \text{Cr}^{\text{III}}$, Fe^{III} and Co^{III}) and $\text{KGdM}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$ ($\text{M} = \text{Fe}^{\text{II}}$ and Ru^{II})

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^{155}Gd Mössbauer spectroscopic studies of the title complexes have been performed. Although the ^{155}Gd isomer shifts (δ) varied scarcely, the quadrupole coupling constants (e^2qQ) changed in the range 4.07–4.81 mm s⁻¹. The e^2qQ values of $\text{KGdM}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$ ($\text{M} = \text{Fe}^{\text{II}}$ and Ru^{II}) are larger than those of $\text{GdM}(\text{CN})_6 \cdot 4\text{H}_2\text{O}$ ($\text{M} = \text{Cr}^{\text{III}}$, Fe^{III} , and Co^{III}), these values increasing with increasing orthorhombic distortion of the crystal structures. A relationship between the e^2qQ values and the ionic radii of the transition metal ions has also been recognized.

Key words: ^{155}Gd Mössbauer Spectroscopy; Quadrupole Coupling Constant; Gd(III) Cyano Polymeric Complex; Orthorhombic Distortion.