

Teaching Tanabe- Sugano Diagrams

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This in-class exercise will examine how the Tanabe-Sugano diagrams can be useful in predicting and analyzing the spectra of transition metal complexes.

For the metal complex $[\text{Mn}(\text{H}_2\text{O})_6]^{3+}$, what is the d electron count?

Use, the appropriate Tanabe-Sugano Diagram Predict the spin-allowed electronic transitions for $[\text{Mn}(\text{H}_2\text{O})_6]^{3+}$.

What changes would you expect if the water ligands were changed to bipyridine (bpy) ligands?

Explain why the free ion Ground state in this TS diagram labeled ^5D ?

What would be the approximate wavelength (in nm) of the $^3\text{T}_1 \rightarrow ^3\text{T}_2$ transition in a complex with $\Delta_0 = 29,040\text{cm}^{-1}$ and $B = 968\text{cm}^{-1}$?