

The octahedral complex of a metal ion M^{3+} with four monodentate ligands L_1 , L_2 , L_3 and L_4 absorb wavelengths in the region of red, green, yellow and blue, respectively. The increasing order of ligand strength of the four ligands is

(2014 Main)

(a) $L_4 < L_3, L_2 < L_1$ (b) $L_1 < L_3 < L_2 < L_4$

(c) $L_3 < L_2 < L_4 < L_1$ (d) $L_1 < L_2 < L_4 < L_3$

- Arrange the complex formed by different ligands L_1, L_2, L_3 and L_4 , according to wavelength of their absorbed light, then use of the following relation to answer the question.

Ligand field strength \propto Energy of light absorbed

	$\propto \frac{1}{\text{Wavelength of light absorbed}}$			
λ	L_1	L_2	L_3	L_4
Absorbed light	Red	Green	Yellow	Blue

Wavelength of absorbed light decreases.

\therefore Increasing order of energy of wavelengths absorbed reflect greater extent of crystal field splitting, hence, higher field strength of the ligand.

Energy blue (L_4) > green (L_2) > yellow (L_3) > red (L_1)

$\therefore L_4 > L_2 > L_3 > L_1$ in field strength of ligands.