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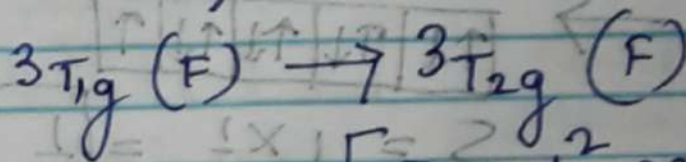
* Spectral broadening :- (Expected Lecture class-3)

Instrumental Broadening
Heisenberg Uncertainty Principle
Ligand field effect
Vibronic Coupling
Peak broadening

Major

Vibronic Coupling :- (vvi)

Let us consider



[For d^2 octahedral complex]

Then the direct product will be

$$T_{1g} \times T_{1u} \times T_{2g} = A_{1u} + A_{2u} + 2E_u + 3T_{1u} + 4T_{2u}$$

Already discussed in previous lecture
 T_{1u} & T_{2u} Coupled with electronic transition

Then

$3T_{1g} \rightarrow 3T_{2g}$ transition are
Vibronically allowed

From the direct product we can see
that three T_{1u} & Four T_{2u} terms.

Thus Coupling of a set of T_{2u} and
 T_{1u} metal-ligand vibrations will produce
a series of components.

These Component or Subpeaks are separated by only $\sim 200 \text{ cm}^{-1}$. These subpeaks broaden the peak.

This is the mechanism of peak broadening by vibronic coupling.