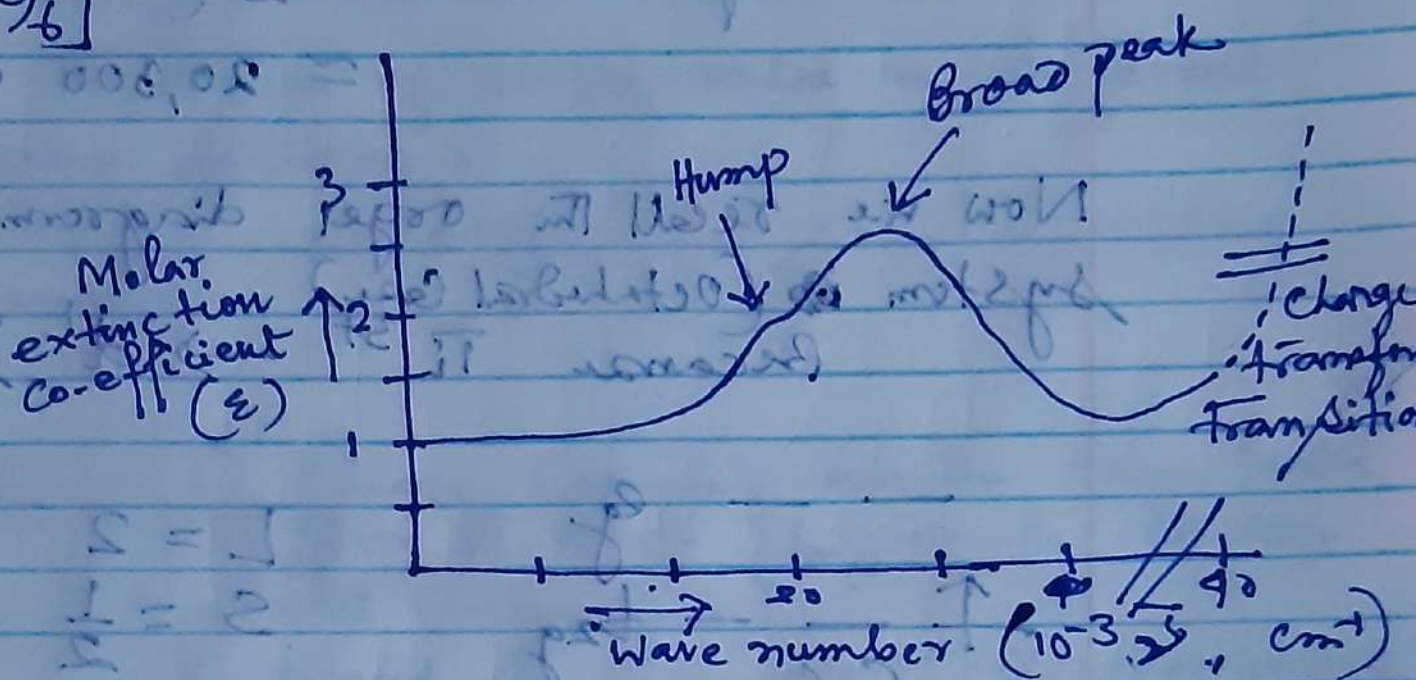


Date :- 08/07/2020

Electronic Spectra of Ti^{3+} Complex

We will talk about the simplest case of Ti^{3+} ,
 $[Ti(H_2O)_6]^{3+}$



* How this spectra looks like?

Weak
Broad
unsymmetrical

* We would like to explain three points about this spectrum.

Position, Poor intensity, Bandwidth

Position \Rightarrow Analysis of the spectrum of $[Ti(H_2O)_6]^{3+}$ indicates that the absorption band appears at $21,000 \text{ cm}^{-1}$ with a shoulder at $19,500 \text{ cm}^{-1}$.

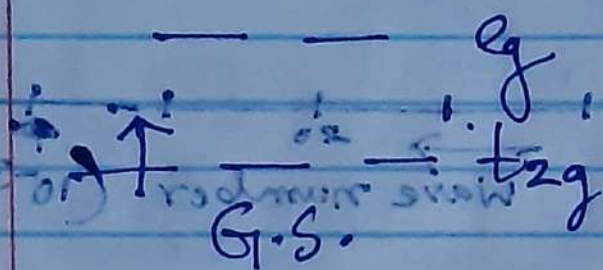
Then next question would be

* What is the average maxima?

$$\text{Average maxima} = \frac{1}{2} (21,000 + 19,500) \text{ cm}^{-1}$$

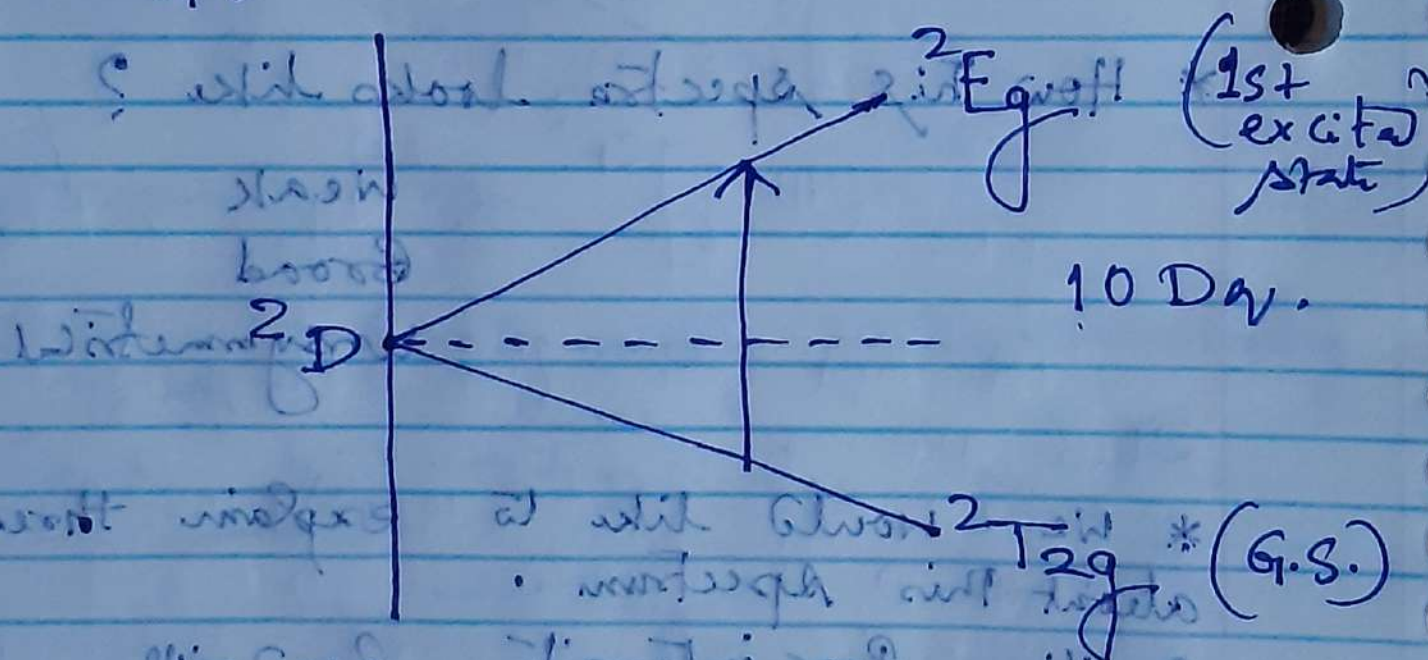
$$= 20,300 \text{ cm}^{-1}$$

Now we recall the energy diagram for d^1 system (Octahedral case)
Because $\text{Ti}^{3+} \rightarrow d^1$ system

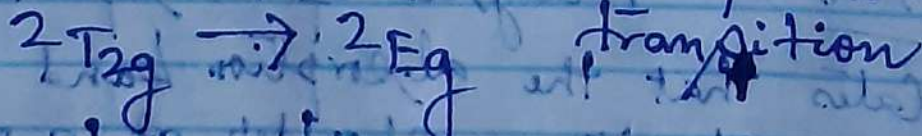


$$L = 2$$

$$S = \frac{1}{2}, 2S+1 = 2$$



Only one band is expected



Now, $10Dq = 20,300 \text{ cm}^{-1}$

$$1Dq = 2030 \text{ cm}^{-1}$$

Next class topic :- (Last lecture of electronic spectroscopy of transition metal)

- ① Poor intensity and Band width
- ② Energy Calculation
- ③ Calculation of $10 Dq$ value in different terms splitting.
- ④ Experimental tools and some interesting examples.

* Note :- ① Please Complete all the home tasks of Sem VI that I have given in ~~to~~ my - notes (lecture notes)

② Next I will start Magnetochemistry (Basic).