

1.

**a. Cu(TPP) is active in UV-Vis AND why? EXPLAIN YOUR REASON.**

**If you replace Cu<sup>2+</sup> with Zn<sup>2+</sup> and you have Zn(TPP), what will happen to the UV-vis spectra? EXPLAIN your answer**

Ans. a. Molecules comprising n-electrons, which are both bonding and non-bonding electrons, can absorb energy in the form of ultraviolet-visible light to excite these electrons to higher anti-bonding molecular orbitals. The lower the energy gap between the highest occupied molecular orbital and the lowest occupied molecular orbital, the more easily are the electrons excited, absorbing a longer wavelength of light.

UV-Vis is used to determine the optical absorption in the visible light region. The UV-Vis spectrum shows the transition of electrons as a consequence of UV-Vis light interactions with chemical bonds.

Reasons for Cu(TPP) showing activity in UV-Vis:

- the metallation increases the symmetry that results in less Q bands.
- the presence of conjugated compounds.
- the presence of the porphyrin section in the catalyst sample
- the large absorbance shows transition from free base porphyrin to confirm metallation.
- pi to pi\* transitions between bonding and antibonding molecular orbital.

**b. Is Wilkinson's catalyst [RhCl(PPh<sub>3</sub>)<sub>3</sub>] active in UV-Vis AND why? EXPLAIN YOUR REASON.**

**Where the UV-vis spectra of the Wilkinson's catalyst [RhCl(PPh<sub>3</sub>)<sub>3</sub>] will be shifted if you replace Cl- with SCN in its crystal structure?**

b. Yes, it is active. The peaks in the visible zone correspond to electronic transitions between ground and excited states for the species. They are linked to the bonds amongst Rh and three