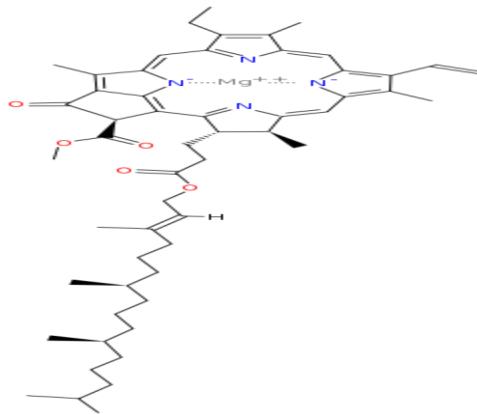
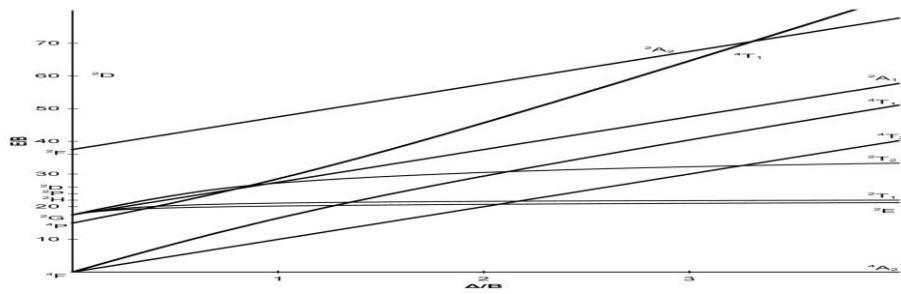


**Scheme 1.** Arrows show the ligand (Oxygen in this case) to metal ( $Mn^{7+}$  in this case) charge transfer (LMCT) responsible for the deep color of permanganate ( $MnO_4^-$ ). See Figure 1 for the values of the electronic transitions of  $KMnO_4$ .



**Scheme 2.** The high degree of conjugation of the chlorophyll molecule is the reason for the green color of chlorophyll. Structure of chlorophyll is known in many references such as Ref #19. The following is another example (Fleming, Ian, Nature, October 14<sup>th</sup> 1967, 216: 151-152, Absolute configuration and the structure of Chlorophyll).



**Scheme 3.** Tanabe-Sugano diagram for  $d^3$  metal ions ( $Cr^{3+}$  is a  $d^3$  metal ion). The color of the  $Cr^{3+}$  metal ion is due to the following electronic transitions:  $^4A_{2g}$  to  $^4T_{1g}$  (which appeared at 420 nm) and due to  $^4A_{2g}$  to  $^4T_{2g}$  electronic transitions (which appeared at 580 nm) see Figure 3. Data were taken from reference #14. The original reference by Tanabe and Sugano is J Phys Soc Jpn 9: 766-779, 1954.