

Chapter 5

Conclusions

The metal-curcumin complexes were prepared by mixing curcumin with some transition metals. The crystal structure of A1 exhibits in monoclinic system with the space group $P2/n$. R and $Rw2$ are 0.0728 and 0.1424 for reflections. The molecule is aggregated inter-molecularly into infinite chain linked between the Ph (-OH) and the carbonyl O by hydrogen bonding. It was found that the hydrogen bonding played an important role in the molecular packing of crystal. Furthermore, the presence of intra-molecular hydrogen bonding indicated that the β -diketones prefer the cis-enol configuration stabilized by H-bond, the hydrogen atom always found to be bonded to one unique oxygen atom. Moreover, the symmetry of the molecule is distorted in the crystal by rotation of C12-C13 bond. XRF spectroscopy was used to check the elemental compositions of Fe and La in Fe-CU1, Fe-CU2 and La-CU complexes. Fe was present in the Fe-CU1 and Fe-CU2 complexes but La did not appear in the La-CU complex. This indicated that Fe reacted with curcumin but La did not react with curcumin. Infrared spectroscopy was used to confirm the mode of vibrations of the ligand in the free state compared with that in the complexes (Fe-CU1, Fe-CU2 and lanthanide complexes). The O-H stretching mode in Fe-CU1 and Fe-Cu2 complexes did not appear in the region $3500-3550\text{ cm}^{-1}$ and the C=O stretching are slightly shifted to lower frequencies, about 36 cm^{-1} . This suggests that the ligand coordinates with the central metal ion (Fe) through the C=O group, the ligand acts as neutral bidentate. The IR spectra of the lanthanide added products are similar to ligand. The O-H and C=O stretching modes did not change in the complexes. This suggests that the ligand did not coordinate with the lanthanide elements and these products are the unreacted curcumin.