the chelates only in case of Eu this change occur endothermally as shown by figure.1—5

2, 4 dihydroxy benzoate hydrates of rare earth elements are stable in air and can be stored for several months without changes. These chelates decompose on heating to the oxides of rare earth metals. First of all dehydration occurs at lower temperature in the range of 50 °C to 100 °C then ligand is decomposed into

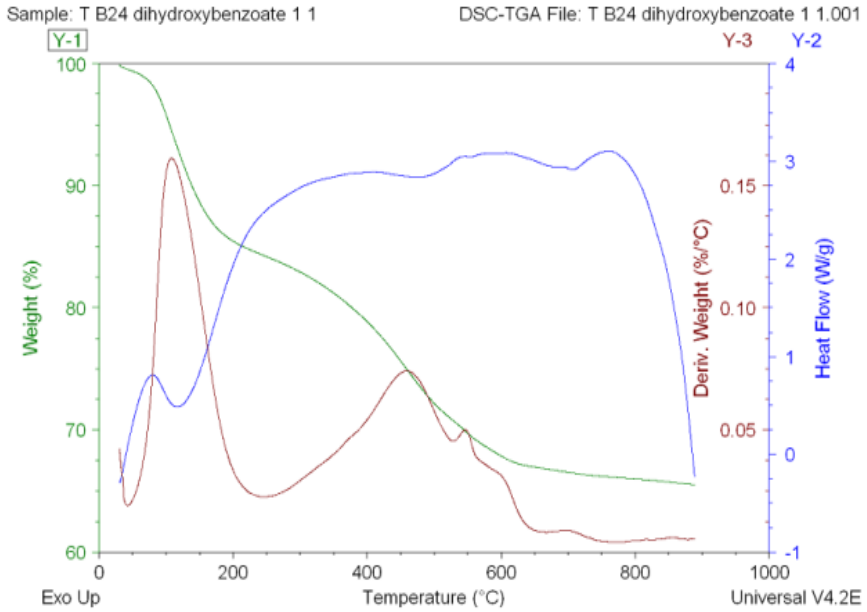

Figure 1: Chelation of 2, 4 dihydroxy benzoic acid withLanthanum in 1:1 ratio

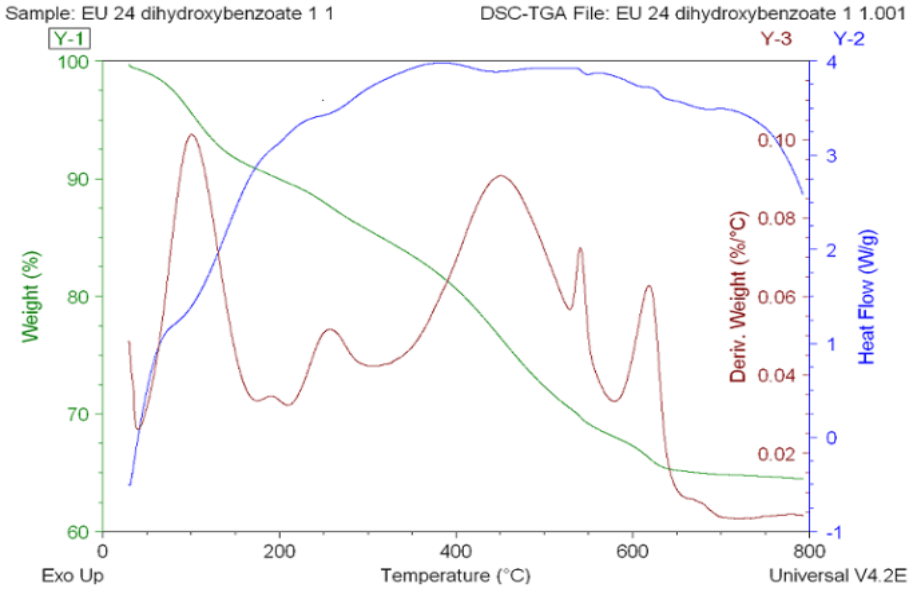

Figure 3: Chelation of 2, 4 dihydroxy benzoic acid withEuropium in 1:1 ratio

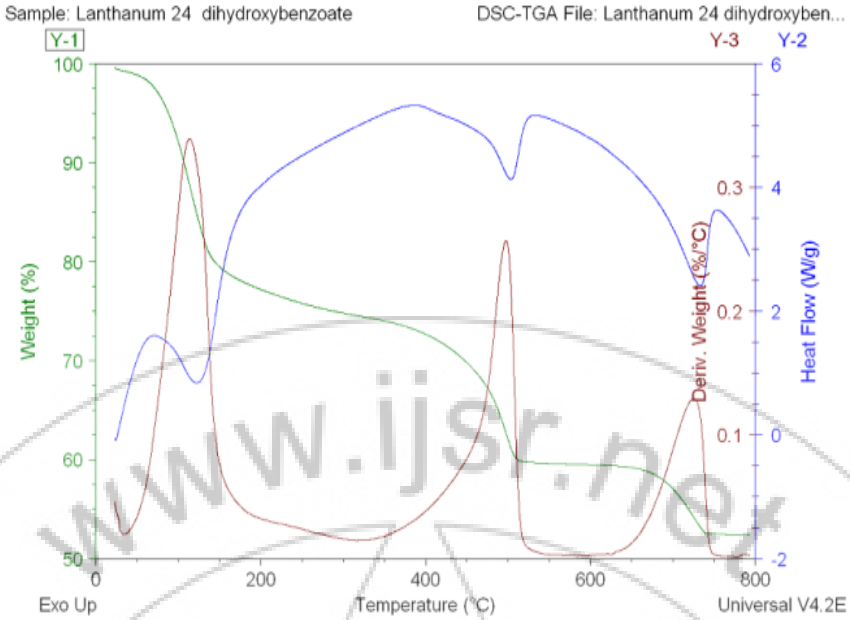

Figure 2: Chelation of 2, 4 dihydroxy benzoic acid withTerbium in 1:1 ratio

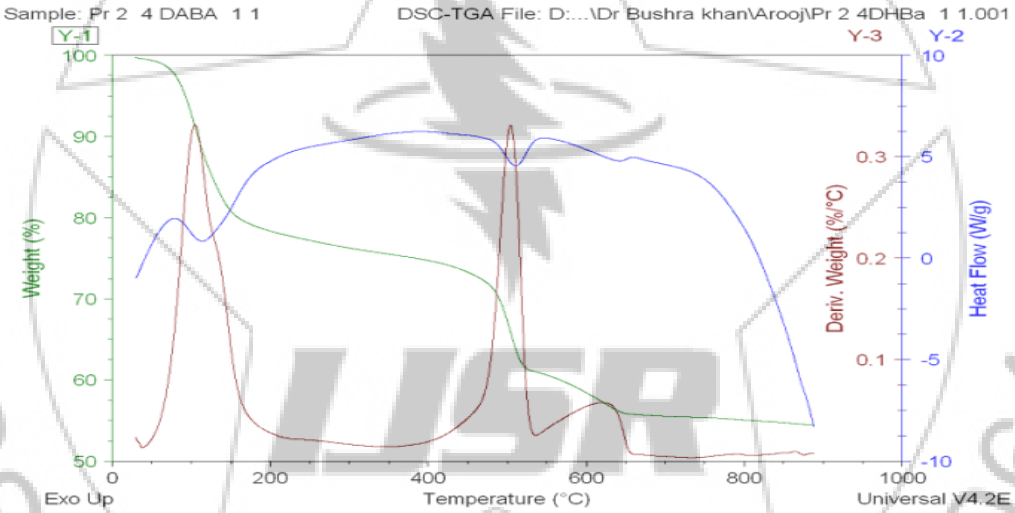

Figure 4: Chelation of 2,4 dihydroxy benzoic acid withPraseodymium in 1:1 ratio

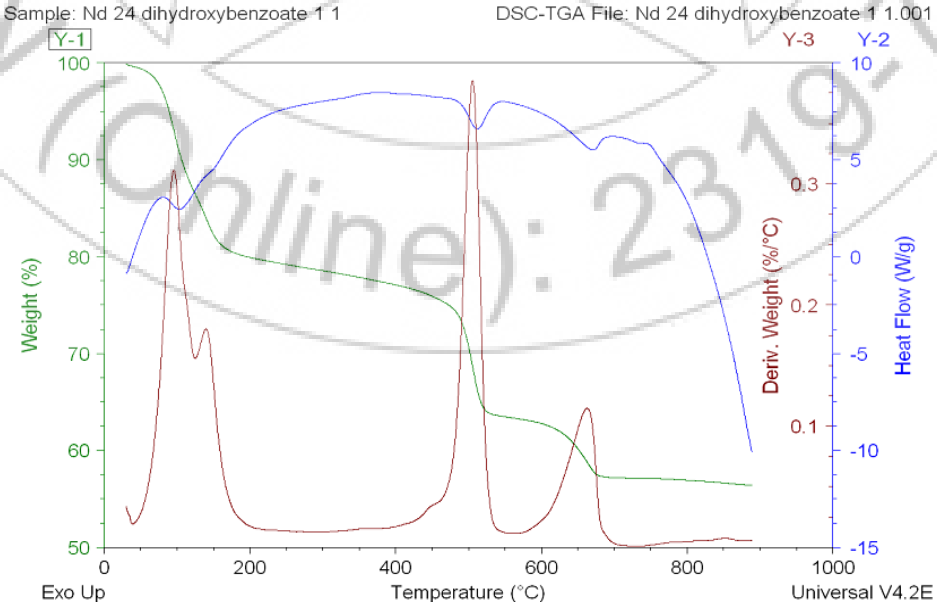

Figure 5: Chelation of 2, 4 dihydroxy benzoic acid withNeodymium in 1:1 ratio

5. Conclusion

The present study was firstly deal with the preparation of rare earth metal derivatives of different salicylates. In this investigation, 2, 4 dihydroxy benzoic acid and 2- hydroxy -5- sulpho benzoic acid were treated with different rare earth metals (La^{III}, Tb^{II}, Eu^{III}, Pr^{III}, Nd^{III}) in different metal – ligand ratios (1:1, 1:2. 1:3). The percentage yield of the synthesized chelates was calculated and their characterizations were investigated by different analytical techniques.

FTIR analysis gives the information that various peaks were shifted and their intensities were changed. Spectra exhibited some new band and also show the disappearance of some absorption this is due to the formation of new bonds by chelation. The information resulted by XRD data is evident that new complexes were formed by chelation of different salicylates with rare earth metal cations. TGA/DTA and DSC gave approval of formation of new chelates. As for as yield is concerned the greatest percentage yield is given by metal-ligand in 1:1, So it is concluded that because of greater binding capacities of above mentioned ligands with rare earth metals give good percentage yield whereas, in case of 1:2 and 1:3 sterric hindrance may reduced the binding capacities and decreased the practical yield as expected in the theoretical calculation.

New synthesis, characterizion of their compounds with FTIR, structure elucidation with XRD and thermal stability with TGA/DTA and DSC gave conclusion that chelation of rare earth metals with 2, 4 dihydroxy benzoic acid is more favorable as compared to the 2- hydroxy -5- sulpho benzoic acid because 2, 4 dihydroxy benzoic acid contains electron donating group so it provides the electron density to the reaction center whereas 2- hydroxy -5- sulfo benzoic acid having electron withdrawing group that draws the electron away from the center of reaction which is not favored for complexation. So the chelates of 2, 4 dihydroxy benzoic acid give more percentage yield as compared to the 2- hydroxy -5- sulpho benzoic acid.

6. Future Scope

This research methodology provides a simple and an efficient means to synthesize important rare earth metal complexes. It can be used as a template to expand the research over other ligands to produce new library of complexes which may be utilized in different ways for human benefits.

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