**ABSTRACT**

Reaction of aqueous metal (Ni(II),Co(II), Cd(II), Zn(II), Cu(II) and Mn(II)) nitrate/ acetate solution with an aqueous solution mixture of hydrazine and 2-hydroxy - 1- naphthoic acid yielded the complexes with formula, (N2H5)2[M{C10H6(COO)(O)}2(H2O)2] where M(II) = Ni, Co, Cd, Zn, Cu and Mn in the pH range of 4-7 and [M(N2H4){C10H6(COO)(O)}(H2O)2]where M(II) = Ni, Co, Cd and Zn at the pH 9. They were characterized by the spectroscopic methods, IR, UV- visible and ESR,magnetic measurements, simultaneous TGÂDTA methods and XRD. Hydrazinium metal naphthoate complexes undergo endothermic dehydration from105°C to 200°C and a strong exothermic decomposition between 336°C and 465°C, forming the respective metal oxides via unstable intermediate [M{C10H6(COO)(O)}], while neutral hydrazine complexes lose water and hydrazine exothermally in the range 192- 230°C, and then undergo strong exothermic decomposition above 230°C upto 451 °C to form metal oxides with no stable intermediates. Incineration of all the complexes at their decomposition temperatures gives metal oxides with the particle size in the range of 25 - 50 nm. The electronic spectra of the Ni, Co and Cu complexes reveal their probable geometry distorted octahedral with CN 6 which was further substantiated by magnetic susceptibility measurement and ESR study. The kinetic parameters for their decomposition have been evaluated by using integrated Coats-Redfern equation from TG data.