physico chamical on some binary_metal oxides and sulphides

Abdullah Ahmed Ahmed El bellihi

A sum8~ry of important results and conclusions of various parts of the present dissertation is given below.In the first part of the present studY,the kinetics of formation of some oxide and sulphide spinels wereinvestigated. stoichiometric -mixtures of CUO-FeZ03 ,Cuo-CrZo3 and CU3-CrZs3were prepared by the co precipitation method from solutions of A.R. salts and calcination at differenttemperatures.The actual amount o~ each metal in each mixture was determined by chemical analysis and the variousprepared samples were -characterized and stUdied by differential thermal analysis-thermogravimetry(DTA TG),infrared spectral analysis(IRA),X-ray diffraction (XRD)and electron microscopy(E:’1) techniques. the kinetics of the solid-solid spinel formationreactions were followed in the temperature range 500-8000C for CUO-FeZ0and CuO-CrZC systems and 200-3000C for CuS-CrZs3 system using a titrimetric tecnnique.Kineticanalysis of the reactions were discussed in view of solidstate reaction models based on diffusion of reactants througncontinueous product layer,pnase boundary reactions,flrst-orderreactions &~d rancom nucleation ffiodels.Yinetic analysis ofdata by linear regression analysis according to various t hecrct i.caI uode Ls sr.,Y.’:te.ahat the spinel f’or-natLo n reactions are best -described by the tnree-aimensional diffusioncontrolled,Jander’s eqUation(D3l,t~o -dimensional diffusion process(D2l and Ginstling-BrounshLein three dimensionalcontrolleu equ~~i8n(D lwhich gave the highest correlation coefficient tnan the other models Kinetic analysis was carried out in the range ofweight fraction (C(lvalues in the range 0.06(OC