Graft copolymerization of haloacyrliC acids on to cellulose

Abd elfatah shaaban

In the present work, the factors affecting the graftingof o(-bromoacrylic acid onto cellulose induced by Ce4+ wereinvestigated. The variables studied were the initiatorconcentration, the reaction temperature, the kind of theinorganic acid used as well as its concentration.Regarding the initiator concentration, the grafting ischaracterized by the initial fast rate which reaches amaximum (78%) then decreased gradually by increasing theCe4+ concentration. Also, the kind of the Ce4+ plays arole on grafting. Thus, in case of Ce4+ obtained by usingceric ammonium sulphate, the maximum was reached at a concentrationof 10 m Mole Ce4+, while using ceric ammoniumnitrate the maximum was reached at Ce4+ concentration of20 m Mole.Concerning the reaction temperature, the graftingreactions were carried out at 3 different temperatures:400,60° and 800C. It was found that increasing the reactiontemperature causes a decrease of the percent grafting inthe systems of water and nitric acid, whereas in case ofthe systems containing hydroc~~oric, sulphuric and perchloricacids the percent grafting increased by increasingthe reaction temperature.In the systems containing nitric, hydrochloric,sulphuric or perchloric acids, it is clear that the percentgrafting increases at the initial stage in each system andgives a maximv~ at a certain time, then increases steadilywith increasing time.The effect of the concentration of the inorganic acidwas also studied. Thus, the grafting reactions were carriedout in presence of 0.05 N, 0.1 Nand 0.2 N acid concentrationsand it is clear that increase of the acid concentrationcauses a decrease in the percent grafting. However, inmost cases, low yields of grafting are obtained on usingacid concentration more than 0 •.1 N.Attempts to determine the percent grafting by bromineanalysis failed because intramolecular lactone formationhas taken place during grafting reaction. This was confirmedby studying the infrared spectra of both 0