ELECTROINDUCED POLYMERIZATION OF ALLYL METHACRYLATE
IN THE PRESENCE OF Ce(IV)

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Electroinduced polymerization of allyl metacrylate (AMA) was carried out with cerium(IV)- DMF redox initiator systems in aqueous solution. The effects of time, cerium (IV), sulfuric acid, monomer, DMF concentrations, potential and temperature on the polymerization yield were examined. An H-type electrochemical cell was employed which was divided by a sintered glass disc to avoid polymer diffusion. The precipitated polymer was obtained in the cathode compartment. The electrodes were platinum foil. The polymers obtained were insoluble in common organic solvents. The resulting polymers were characterized using FTIR, NMR, DSC and TGA-FTIR, and the pictures of the polymers were taken by SEM. To evaluate the polymerization mechanism, UV-Vis spectrophotometric and cyclic voltammetric (CV) studies were performed. Spectrophotometric and thermal experiments showed that during polymerization, allyl groups were not opened and did not contribute to the polymerization. The polymerization proceeded by the opening of vinylic bonds. Glass transition temperature (Tg) was not observed due to the probable curing temperature of the polymers. A two stage degradation mechanism was observed by the TGA-FTIR study. In the first stage allyl groups were eliminated from the structure and in the second stage, the formation of anhydride followed a random elimination of the anhydride which was formed as given in the literature.[1,2] The study of UV-Vis and CV showed that monomer reacted with DMF in the presence of Ce(IV), and the proposed mechanism was as given in the literature.[3,4] SEM pictures showed that the polymers accumulated as random plates and were concentrated on each other.

References