

Graft copolymerization of methyl acrylate onto sago starch using ceric ammonium nitrate as an initiator

ABSTRACT

The graft copolymerization of methyl acrylate onto sago starch was carried out by a free radical initiating process. The free radicals were produced by the chemical initiation method in which ceric ammonium nitrate was used as an initiator. It was found that the percentages of grafting, grafting efficiency, and rate of grafting were all dependent on the concentration of ceric ammonium nitrate (CAN), methyl acrylate (MA), sago starch (AGU), mineral acid (H₂SO₄), and reaction temperature and period. The variables affecting the graft copolymerization were thoroughly examined. The optimum yield of grafting was obtained when the concentration of CAN, MA, AGU, and H₂SO₄ were used at 8.77×10^{-3} , 0.803, 0.135, and 0.175 mol L⁻¹, respectively. The optimum reaction temperature and period were 50°C and 60 min, respectively. The rate of graft polymerization was explored on the basis of experimental results and reaction mechanism. The evidence of grafted copolymers was investigated by using FTIR spectroscopy, TG, and DSC analysis.

Keyword: Graft copolymerization; Sago starch; Free radical; Monomer and poly(methyl acrylate) polymer