

PHOTO-INDUCED RING OPENING POLYMERIZATION OF LACTONES

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A great deal of effort has been directed to improving light-induced polymerizations such as radical, cationic and ring opening polymerization (ROP). In particular, ROP of cyclic esters has been widely used for the synthesis of biodegradable polyesters. Besides that, there has been many attempts to apply ROP in various reaction conditions, organocatalysts have attracted growing interest over conventional metallo-organic complexes, due to their numerous advantages such as high selectivity, control over molecular weight and leaving no trace of metal residues [1]. Thus, organocatalysts have been a promising alternative for the syntheses of polymeric materials predominantly used in bio-related systems. In this context, photosensitizers are also useful for onium-salt induced cationic photopolymerizations providing the advantages of tuning the wavelength sensitivity and lowered photoinitiator concentration [2]. Within this work, the use of diphenyl iodonium hexafluorophosphate salt as an effective catalyst for the cationic ring-opening polymerization of different cyclic lactones under UV irradiation was reported. Furthermore, different photosensitizers were employed for the photosensitization of diphenyl iodonium salt. The effect of irradiation time, monomer/initiator ratio and the use of different photosensitizers on molecular weight of the resulting polymers were investigated in detail by spectroscopic analyses.

[1] Barker, Ian A., Dove, A.P (2013). Triarylsulfonium hexafluorophosphate salts as photoactivated acidic catalysts for ring-opening polymerizations. *Chemical Communications*, 49 (12), 1205-1207.

[2] Yonet, N., Yagci, Y., Ochiai, B., & Endo, T. (2003). Photoinitiated cationic ring-opening polymerization of monothiocarbonate. *Macromolecules*, 36(24), 9257-9259.