PHOTO-INITIATED RAFT PROCESS OF N-VINYLM FORMAMIDE USING VARIOUS CHAIN TRANSFER AGENTS

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ABSTRACT

Poly(N-vinyl formamide) (PVF) is widely used in pharmaceutical, medical, and cosmetic applications due to its good solubility in water, good biocompatibility, and low toxicity. Among them, the most important use of PVF is a precursor to poly(vinyl amine). PVF can be generally obtained by free radical polymerization of N-vinyl formamide (NVF). However, there have been no study about controlled radical polymerizations of NVF. This comes from the fact that the produced radical species are highly reactive because of strong electron donating pendant groups and the lack of resonance stabilization.1) In this study, we synthesized PVF through photo-initiated reversible addition-fragmentation chain transfer (RAFT) process using various xanthates as a chain transfer agent (CTA). The linear first order kinetic plot of ln([M0]/[M]) over time was observed, indicating low level of irreversible termination reaction. On the other hand, molecular weight and conversion plot deviated from a linear relationship in varying degree depending on the applied CTA, possibly due to the difference in stability of the radicals generated from the CTA molecules.

Fig. 1: The 1st order kinetics plot for photo-initiated RAFT polymerization of NVF

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References: