

ARGET ATRP of Vinyl Acetate Catalyzed by Elemental Cu(0) in Supercritical Carbon Dioxide

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Poly(vinyl acetate) was synthesized by activators regenerated electron transfer atom transfer radical polymerization (ARGET ATRP) in supercritical CO₂. Elemental or zerovalent copper (Cu⁰) wire was used instead of the traditional reducing agents, thereby ease of separability and recyclability was exhibited by copper wire. For better controllability and reaction rate, a catalyst/ligand system was implemented. Zerovalent copper provided tremendous controllability over Mn and MWD (Mw/Mn ~1.10) without falsifying the reaction rate negatively. Significant enhancement of deactivation rate constant and effective reversibility of the equilibrium in the presence of zerovalent copper might be opted as the potential reason. Polymers with wide range of molecular weights (Mn = 10 to 100 kg/mol) were synthesized in a controlled manner as well.

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