

**Dispersion polymerization of N-vinyl-2-pyrrolidone in supercritical carbon dioxide:  
the effect of thermal decomposition of initiator**

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Supercritical carbon dioxide (scCO<sub>2</sub>) is considered as a useful alternative of toxic or volatile organic solvents in fields of synthesis and modification of polymers. In a polymerization process, the properties of the product, such as particle size and molecular weight distribution, are closely related with the decomposition rate of initiator. The decomposition rate of initiator in supercritical carbon dioxide is of importance for controlling the properties of the polymer, so we studied thermal decomposition of 2,2 azodis(isobutyronitrile) (AIBN), a commonly used initiator, and 2,2 azobis(2,4-dimethylvaleronitrile) (ADVN), a low-temperature initiator, at various temperature and pressure ranges by UV/VIs spectroscopic method. We also carried out cross-linking polymerization of PVP using N,N-methylenebisacrylamide, ethylene glycol dimethacrylate as cross-linking agent and PDMS-g-pyrrolidone carboxylic acid (Monasil PCA) as surfactant in supercritical carbon dioxide.