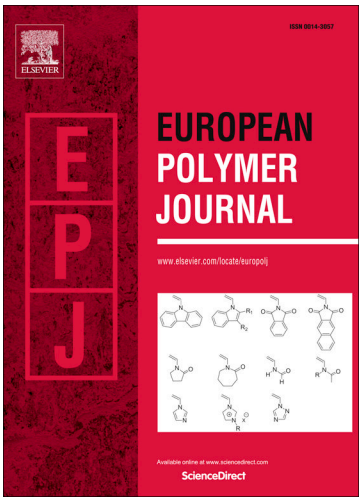

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Thermoreversible gelation of poly(urethane *acyl*-semicarbazides) carrying cycloaliphatic moieties and studies on selective adsorption of dyes from wastewater

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ABSTRACT:

A series of linear segmented poly(urethane *acyl*-semicarbazides) of different compositions were synthesized from polypropylene glycol (M_n~1000 and 2000), hexamethylene diisocyanate and cyclohexanedicarboxylic acid 1, 4 dihydrazide. The polymers exhibited thermoreversible gelation at a minimum gelation concentration of 25 mg/mL in DMSO in about 25 minutes. Among the comparisons of varying NCO/OH ratios, PPG_{1000} based polyurethanes with NCO/OH ~ 2.5 and 3 and PPG_{2000} based systems with NCO/OH ~ 3.0 and 3.5 exhibited gelation. IR studies on the solutions and gels (in DMSO) revealed the extensive H-bonding between the chains in gel state. Scanning electron micrographs of the xerogel revealed a 3D-network structure - higher hard segment content (P_{1000}-1:3.5) led to a fibrous morphology and lower hard segment content (P_{2000}-1:3) led to a microsphere like architecture. The phase separation induced gelation mechanism of self-assembly and effect of the stoichiometry on the morphology were explained based on the correlation between DSC, WAXS and FE-SEM data. The xerogels of the self-assembled polymers described in this work demonstrate a remarkable ability to remove dye