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Mechanical properties of syndiotactic polypropylene (sPP) gels: the effects of temperature and solute concentration RYUSUKE OKOSHI, ATSUSHI HOTTA, Department of Mechanical Engineering, Keio University — The effects of the solute concentration on the microstructures and the mechanical properties of quenched syndiotactic polypropylene (sPP) gels were investigated. Our group has previously reported a highly resilient sPP gel quenched using liquid nitrogen (Gel LN). In this research, sPP/decahydronaphthalene gels were prepared varying the sPP concentrations from 5 to 20 wt%. Compression test was carried out to evaluate the mechanical properties. Scanning electron microscopy (SEM) was conducted to analyze the microstructures. Gel LN with the sPP concentration of 20 wt% presented a high fracture stress of 2400 kPa. A high fracture strain of 70% was also observed for all Gel LN samples. By contrast, sPP gels with the sPP concentration of 20 wt% cooled at 25 degrees C (Gel 25) showed lower fracture stress of 480 kPa. The fracture strain of Gel 25 ranged from 21 to 37% depending on the sPP concentrations. The SEM results revealed that the Gel LN samples had homogeneous networks regardless of the sPP concentrations. The Gel 25, however, possessed inhomogeneous networks with spherulites. It was therefore concluded that the strengthening of the sPP gels could be effectively achieved by Gel LN regardless of the sPP concentrations.

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