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Mechanical similarities observed between polypropylene gels and molten polypropylenes TETSU OUCHI, MISUZU YAMAZAKI, ATSUSHI HOTTA, Department of Mechanical Engineering, Keio University — The gelation of syndiotactic and isotactic polypropylenes (sPP and iPP) was found when PPs were dissolved in 1,2,3,4-tetrahydronaphthalene (tetralin). Interestingly, it was found that the storage modulus of sPP-gel became higher than that of iPP-gel when PPs were dissolved in tetralin at low PP concentration (<40 wt%). The result was distinctly different from the result of the neat PPs without solvent, as it is widely known that the modulus of sPP is significantly lower than that of iPP. Moreover, by measuring the storage moduli of solid sPP and iPP as a function of temperature, it was found that, above the melting points of PP, the storage modulus of sPP became higher than that of iPP, which was similar to the behavior of the storage modulus observed in the dilute PP-gels. Such mechanical similarity between PP-gels and PP-melts was also observed within iPP samples with different molecular weights. From these experimental results, it was considered that the amorphous phase of PP had profound influence on the mechanical properties of PP-gels at low PP concentration (<40 wt%), while the crystalline phase of PP had a major impact on the mechanical properties of PP-gels at relatively higher PP concentration (>40 wt%).

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