

高分子学会九州支部 外国人講演会

高分子学会九州支部主催の外国人講演会を下記の通り開催いたします。

日時：12月19日（月）15：00 - 16：00

場所：大分大学 旦野原キャンパス 理工8号館 107号室

講師：Prof. Daewon Sohn (孫大原) (Hanyang University (漢陽大學校), Seoul, Korea)

題目：**Properties and structures of hydrogels controlled by coordination bond**

Abstract: Metal complexation-based gelation imparts load-bearing hydrogels with striking properties like reversibility, self-healing, and mechanical tunability. We developed hyaluronic acid (HA) hydrogels by regulating the gelation kinetics of Fe^{3+} and a catechol cross-linker, including Fe^{3+} -induced covalent bonding and coordination bonding. Dual roles of Fe^{3+} in catechol-modified HA (HA-CA), Fe^{3+} -catechol coordination, and catechol oxidation followed by a coupling reaction, were selectively applied for different gelations. Tetra-poly(ethylene glycol) with catechol end groups (t-PEG-CA) was also crosslinked through coordination bonds between catechol moieties and Fe(III) ions, which produce bis-complex and tris-complex depending on pH levels. The structure and property of t-PEG-CA gels were examined upon the bonding types controlled by pH levels and molar ratios between catechol groups and Fe(III) ions. The coordination bond types were probed by UV absorption peaks and Raman spectra. The correlation lengths (ξ) were determined in the semi-dilute solution regime and the t-PEG gel networks using light scattering, small-angle X-ray scattering, and neutron scattering measurements. For the gels with bis-complex units, ξ values correspond to the size of a single polymer chain. Otherwise, they increased in the gels consisting of tris-complex units, indicating that the matrices have partial crosslinks. The results show structure and property of gels can be controlled by geometries of crosslinking units as a strategy to develop novel polymer gels.