Abstract Submitted
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Small angle neutron scattering study to determine the structure of high strength hydrogels.[1] TAIKI TOMINAGA[2], Graduate School of Science, Hokkaido University, Japan, VIJAY R. TIRUMALA, ERIC K. LIN, WEN-LI WU, Polymers Division, National Institute of Standards and Technology, JIAN PING GONG, HIDEMITSU FURUKAWA, YOSHIHITO OSADA, Graduate School of Science, Hokkaido University — Hydrogels are swollen polymer networks containing more than 90% water. Most hydrogels, however, are mechanically too weak to be used as load bearing devices. Gong *et al.* have overcome this problem by synthesizing hydrogels with a double network (DN) structure. Modifying the polyelectrolyte network structure by polymerization of high molecular weight uncharged polymer *in situ*, resulted in orders of magnitude increase in their load bearing ability. Despite 90% water, these tough gels exhibit a fracture stress of 170 kg/cm^2, similar to that of articular cartilage found in the bone-joints of human body. In this work, we determined the structure of DN-gels using small angle neutron scattering. Structural origins for high toughness found in DN-gels were then examined by comparing the structure of DN-gels with that of pure polyelectrolyte network and polyacrylamide solution.

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