

Physical properties of PEG hydrogel hardening in interpenetration of ionic polymers

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The triple-interpenetrating polymer networks(tri-IPNs) were formed by synthesis of a crosslinked poly(acrylic acid)(PAA)-polyacrylamide(PAm) network within poly(ethylene glycol) hydrogel networks in order to reduce decrease of mechanical properties of PAA/PEG IPNs in high pH due to disappearing interpolymer hydrogen bond. The interaction between the independently crosslinked networks within the IPNs was varied by controlling the degree of PAA and PAm ionization by changing pH, increasing polymer content in the PAA/PEG network, and crosslinking between amine and carboxyl group by 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide hydrochloride(EDC)/N-hydroxysuccinimide(NHS). The hydrogen bond and crosslinking between amine and carboxyl group were observed by FTIR spectra. The pH effect of tri-IPN hydrogel was observed by tensile strength in proportion to various pH levels. The transparency and water content of tri-IPN hydrogel were observed for uses of biomaterials.