

pH-Responsive Complexation Hydrogels for Intelligent Drug Delivery System

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Methacrylic acid (MAA)-containing copolymer networks of poly(methacrylic acid-g-ethylene glycol) have been shown to be excellent carriers for intelligent drug delivery systems due to their pH-sensitive swelling behavior. Incorporation of MAA in the polymer networks led to novel networks forming complexes responding to environmental pH changes. Using attenuated total reflectance-Fourier transform infrared spectroscopy, the polymer complexes were investigated in the hydrated state. In acidic media, hydrogen bond formed resulting from the protonation of the carboxylic acid groups of the PMAA, while in basic or neutral conditions electrostatic repulsion occurred between the ionized carboxylic acid groups. This complexation affected the macroscopic swelling and release behaviors of the hydrogels. The swelling and release properties of the hydrogels depending on environmental pH changes were investigated, which indicated that the hydrogels could be used as intelligent delivery carries for pharmaceutical and cosmetic applications.