

### The enhanced gellation of Pluronic F-127 by heparin

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For the localization of heparin on PLGA nanoparticle, the interaction between heparin and Pluronic polymer was investigated by the sol-gel transition temperature and the rheological properties of the heparin-Pluronic hydrogels. The decrease of the transition temperature was consistently shown in all media (distilled water, phosphate buffer, and PBS) as the added amount of heparin increased. In contrast, the addition of PEG produced the increase of the transition temperature. The order of phase transition with increasing temperature (Heparin-Pluronic > Pluronic > PEG-Pluronic) obtained from the change in the storage modulus of the Pluronic solutions well coincided with the results obtained from the inverting vial method; a plateau of storage modulus in frequency sweep was developed at the lowest temperature for the heparin-Pluronic hydrogel, and the plateau modulus of the heparin-Pluronic hydrogel was higher than that of the pure Pluronic hydrogel near the sol-gel transition boundary. These results demonstrate that the interaction between heparin and Pluronic polymer exists, which promotes the Pluronic micelle-micelle association.