

Control of the Chemical Cross-Linking of Gelatin by a Thermosensitive Polymer: Example of Switchable Reactivity

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Chemical cross-linking of gelatin is achieved using a thermosensitive reactive copolymer based on *N*-isopropylacrylamide (NIPAM). The copolymer bears 5 mol % acrylic acid units which form amide bonds with the amino groups of gelatin in the presence of a water-soluble carbodiimide. The cross-linking reaction occurs only below the LCST $\cong 34$ °C (lower critical solution temperature), i.e., when the copolymer is in the coil conformation. Above the LCST the copolymer adopts a globule conformation and its ability to react with gelatin is drastically reduced. By setting the temperature above or below the LCST it is possible to switch *off* or *on* the reactivity of the system and control the gelation process. The switch temperature can be set at the desired value by adjusting the composition of the thermosensitive copolymer.