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1 **Rapid Shape Memory TEMPO-Oxidized Cellulose**
2 **Nanofibers/ Polyacrylamide/ Gelatin Hydrogels with**
3 **Enhanced Mechanical Strength**

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12 **Abstract**

13 TEMPO-oxidized cellulose nanofibers/ polyacrylamide/ gelatin shape memory hydrogels
14 were successfully fabricated through a facile in-situ free-radical polymerization method, and
15 double network was formed by chemically cross-linked polyacrylamide (PAM) network and
16 physically cross-linked gelatin network. TEMPO-oxidized cellulose nanofibers (TOCNs)
17 were introduced to improve the mechanical properties of the hydrogel. The structure, shape
18 memory behaviors and mechanical properties of the resulting composite gels with varied gel
19 compositions were investigated. The results obtained from those different studies revealed
20 that TOCNs, gelatin, and PAM could mix with each other homogeneously. Due to the
21 thermoreversible nature of the gelatin network, the composite hydrogels exhibited attractive
22 thermo-induced shape memory properties. In addition, good mechanical properties

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