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PROCEEDINGS

Numerical Simulation of In Situ Deformation Behavior of Pt-DNA Hydrogel

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ABSTRACT

Pt-DNA hydrogel is formed by cross-linking the DNA strands with Pt-ions and the resultant three-dimensionally cross-linked DNA strands' network is expected be used as a biocompatible polymeric carrier, i.e. the drug delivery platform for in situ tissue repair due to its high toughness. On the other hand, as another essential qualification for the drug delivery platform, the stability of the microstructure of the platform is indispensable.

To evaluate the stability of the microstructure of Pt-DNA hydrogel, in this study, we at first employ the nonaffine molecular chains' network model to reproduce the experimental results of the Pt-DNA hydrogels with different content of Pt-ions under simple tension. And then, the deformation of the microstructure of the Pt-DNA hydrogel is characterized by the development of the number of the cross-linkages of the molecular chains' network. Finally, a series of simulations are performed to investigate the deformation of the microstructure of the Pt-DNA hydrogel under various loading conditions as in situ.

KEYWORDS

Hydrogel; deformation behavior; nonaffine model; simulation

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