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Authors: Tiantian Zhang, Qiaoyun Cheng, Dongdong Ye, Chunyu Chang



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# Tunicate cellulose nanocrystals reinforced nanocomposite hydrogels comprised by hybrid cross-linked networks

Tiantian Zhang <sup>a</sup>, Qiaoyun Cheng <sup>a</sup>, Dongdong Ye <sup>a</sup>, Chunyu Chang <sup>a,b,\*</sup>

<sup>a</sup> College of Chemistry and Molecular Sciences, Wuhan University, Wuhan 430072, China

<sup>b</sup> Guangdong Provincial Bioengineering Institute (Guangzhou Sugarcane Industry Research Institute), Guangdong Provincial Key Laboratory of Sugarcane Improvement and Biorefinery, Guangdong Provincial Engineering Laboratory of Biomass High Value Utilization, Guangdong Provincial Engineering Technology Research and Development Center of Biomass Comprehensive Utilization, Guangzhou Key Laboratory of Biomass Comprehensive Utilization, Guangzhou, Guangdong 510316, China

Corresponding author: Chunyu Chang (Email: changcy@whu.edu.cn)

## Highlights

- 1 Q-TCNCs acted as both nanofillers and physical cross-linkers in the hybrid cross-linked PAA networks.
- 2 The hydrogels exhibited porous morphology, controllable swelling ratio, and pH sensitive behaviors.
- 3 The mechanical properties including strength, ductility, elasticity and toughness of hydrogels were significantly improved.

## ABSTRACT

Cellulose nanocrystals are considered as promising biomass nanofillers for polymeric hydrogels, but poor interface compatibility between cellulose nanocrystals and hydrogel matrix usually reduces their reinforcement effect. Here, we reported a novel interface compatible nanocomposite hydrogel prepared by introducing quaternized tunicate cellulose nanocrystals (Q-TCNCs) into chemically cross-linked poly (acrylic acid) (PAA) networks. Q-TCNCs acted as both nanofillers and physical cross-linkers in the PAA networks, and the electrostatic interaction between the positive charges of

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