

Supplementary

Cellulose–Silver Composites Materials: Preparation and Applications

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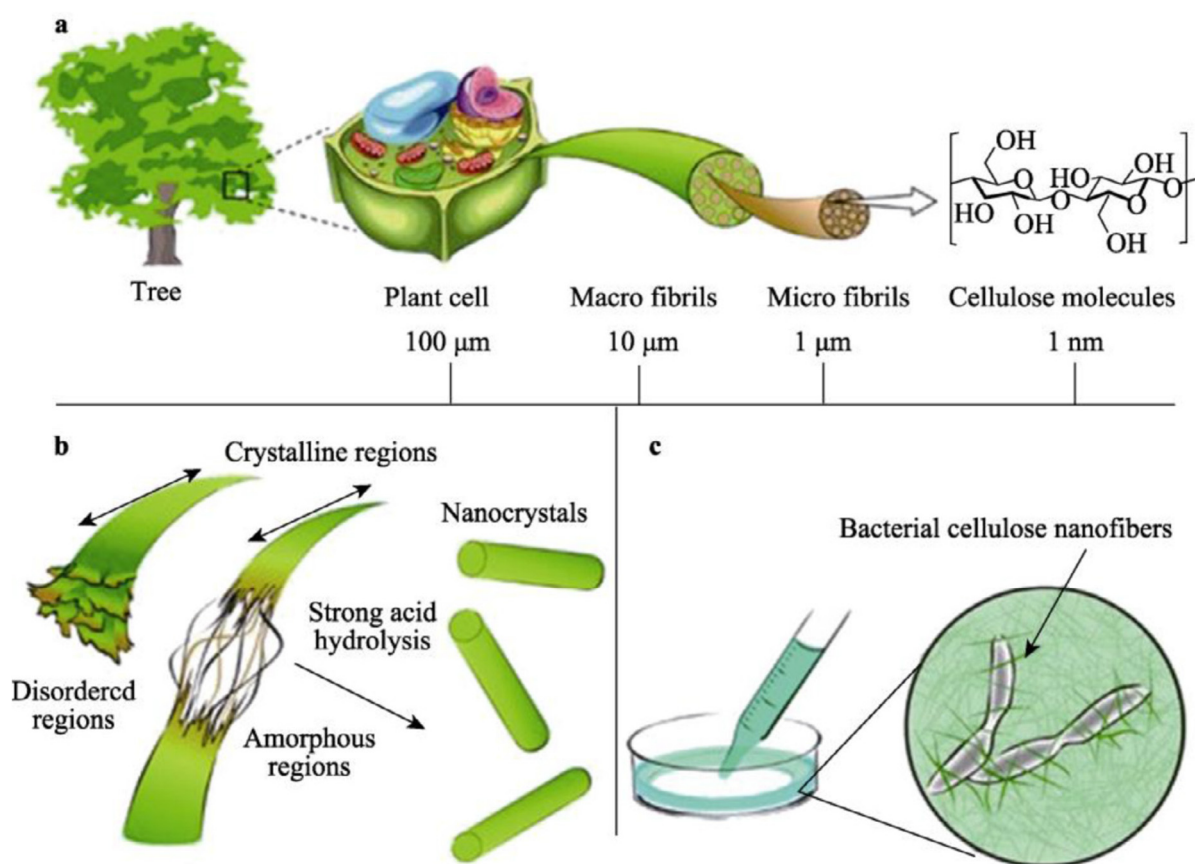


Figure S1. (a) Cellulose in plants structure to nanometer scale. (b) The schematic diagram of the acid hydrolysis of cellulose to obtain nanocellulose. (c) Synthesized bacterial cellulose nanofibers [1]. (Reproduced under Creative Commons Attribution, Copyright 2020, Daisuke Miyashiro et al. 2020).

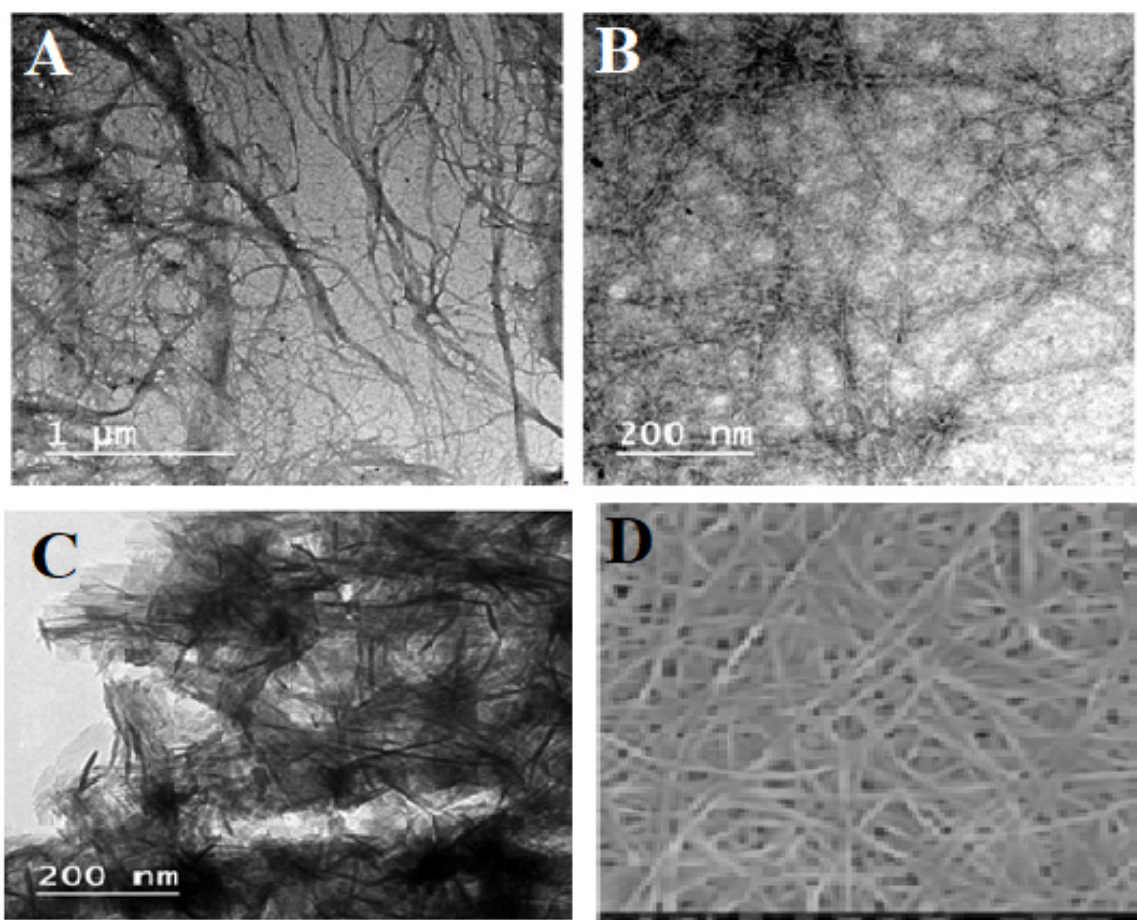


Figure S2. TEM of CNF (A) and TEMPO-oxidized CNF (B) isolated from date palm fruit stalks (M. Hassan et al., 2017). (C) Cellulose nanocrystals obtained by sulfuric acid hydrolysis from rice husk [2], and (D) SEM images of freeze-dried BC harvested after two days (magnification: 50,000 X) [3]. Reproduced under Creative Commons Attribution, Copyright 2017 Hassan et al. Reproduced under a Creative Commons Attribution 4.0 International License Abou-Zeid et al., 2018.

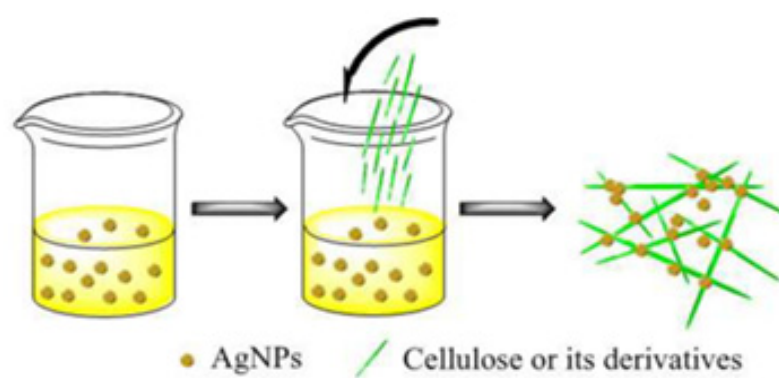


Figure S3. Physical method of preparation of AgNPs-Cellulose composites [4]. Open access.

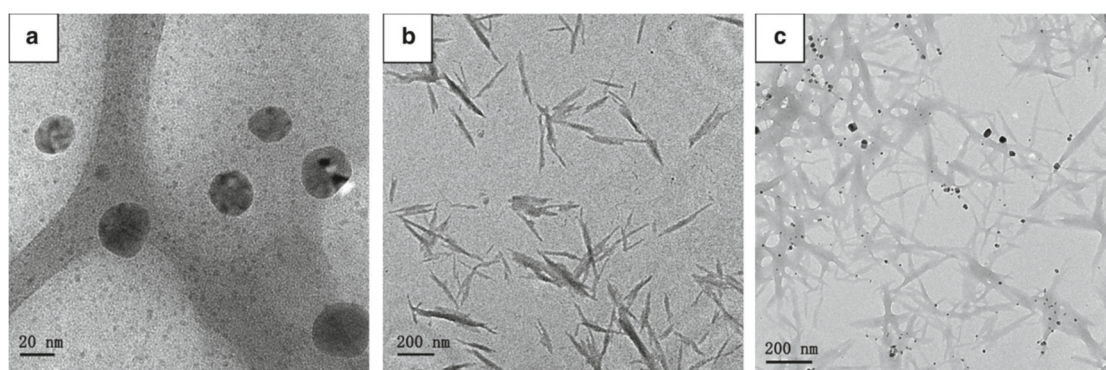


Figure S4. TEM of (a) AgNPs, (b) CNCs and (c) silver-loaded nanocellulose [5].

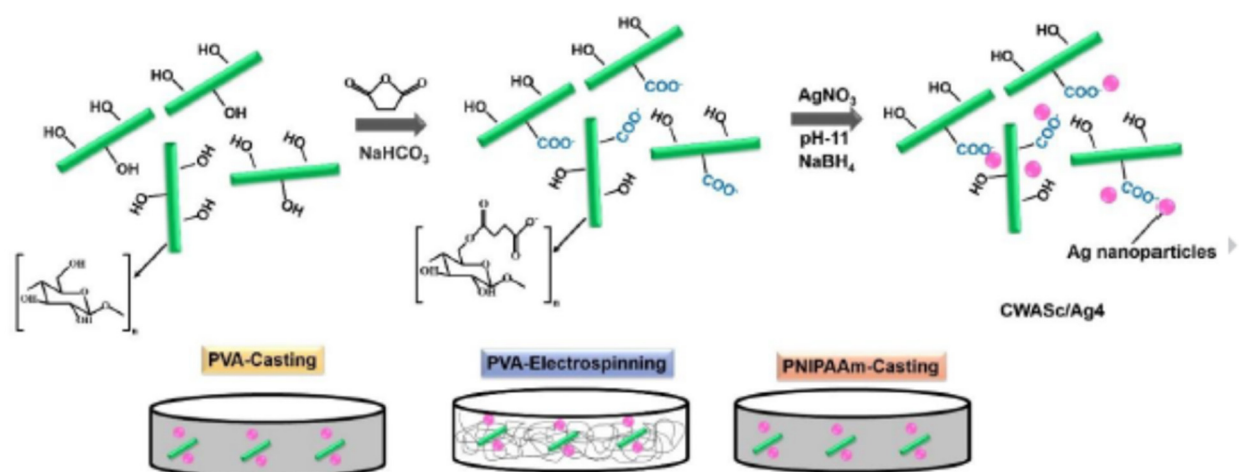


Figure S5. Schematic illustration of the formation of PVA or poly (Nisopropylacrylamide) films with cellulose nano-whiskers functionalized with carboxylate groups/AgNPs (Spagnol et al., 2018). Copyright 2018, with permission from Elsevier.

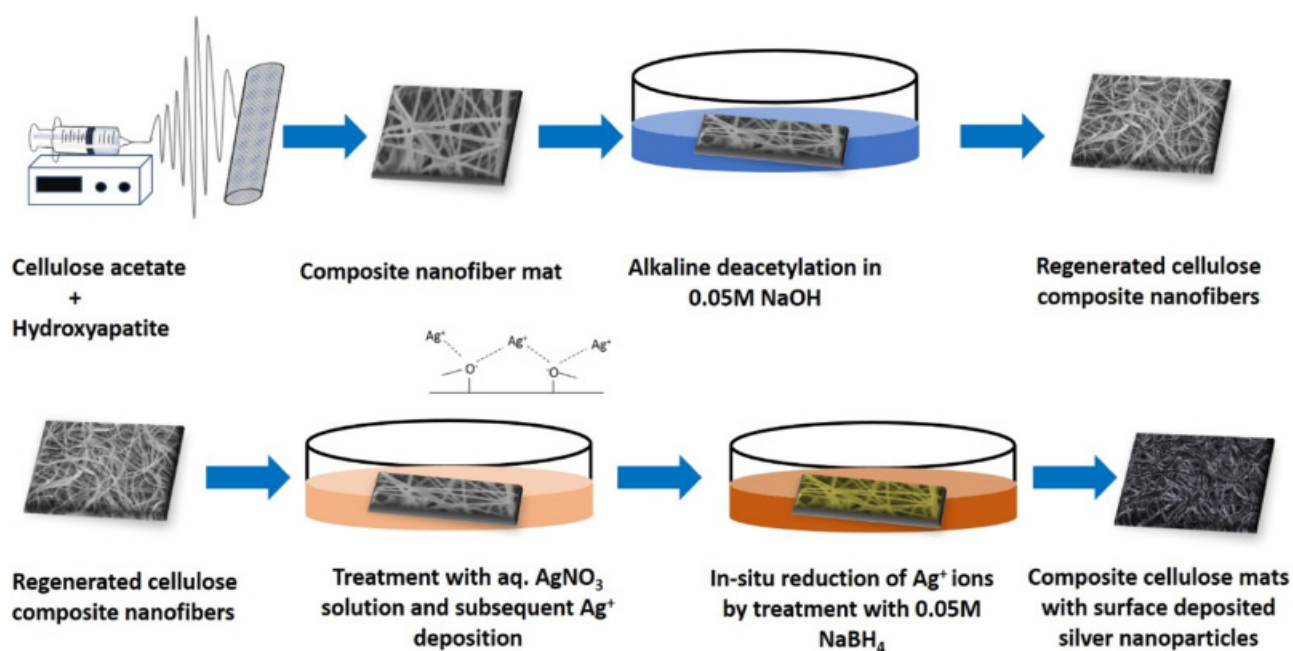


Figure S6. An illustration of the fabrication of cellulose nanofiber mats containing HAp and Ag NPs. In this section, the various steps of fabrication are described sequentially.

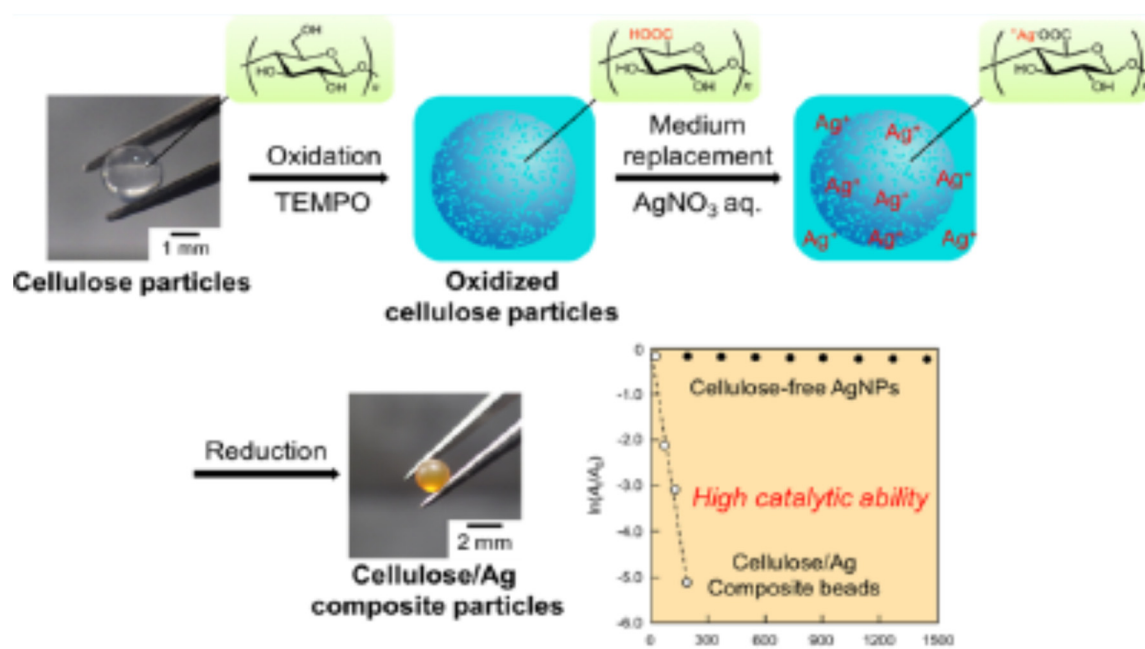


Figure S7. Schematic illustration of oxidized cellulose/AgNPs beads and its catalytic ability [7].

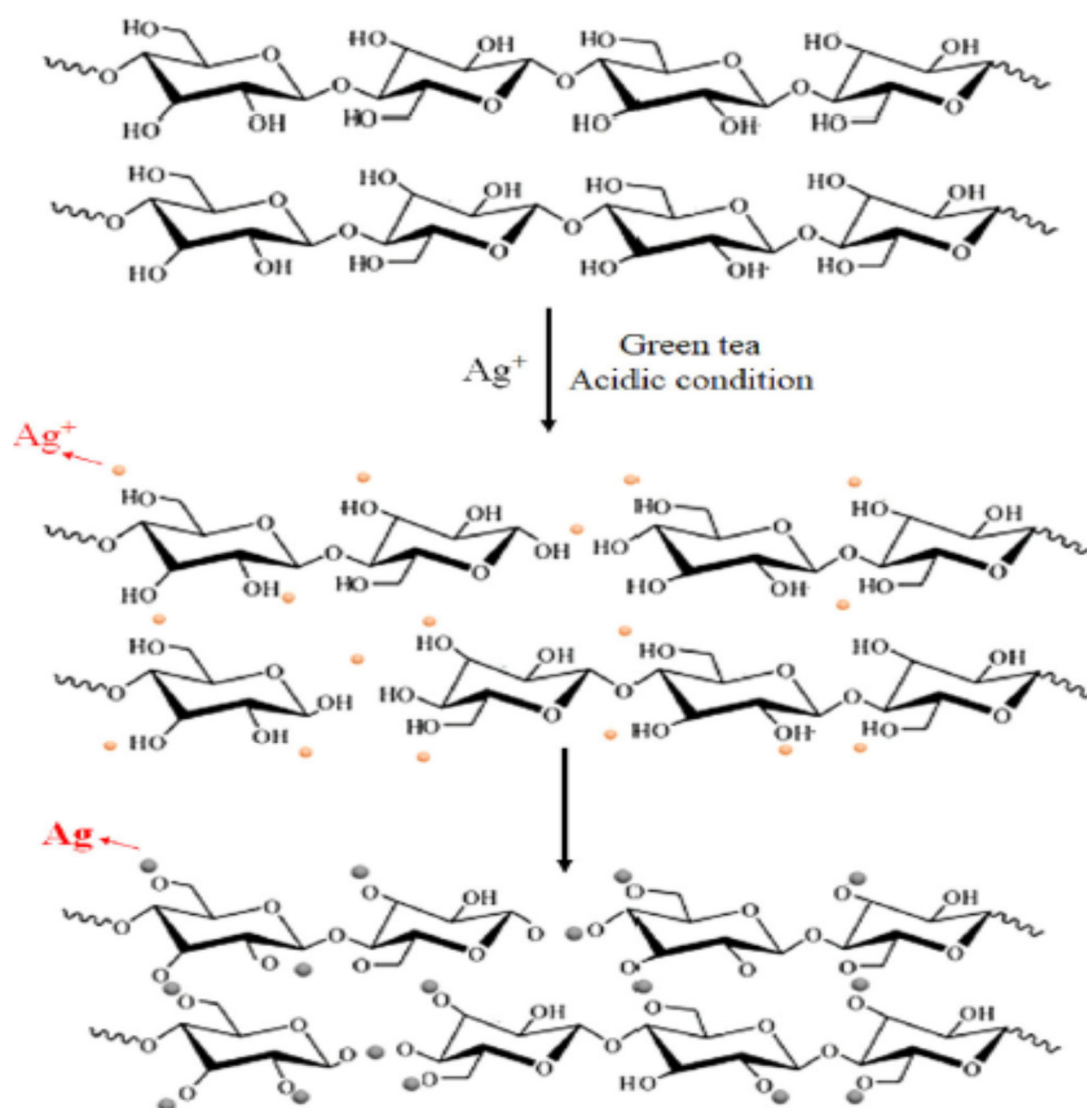


Figure S8. Role of BC hydrogel groups in the synthesis of AgNPs.

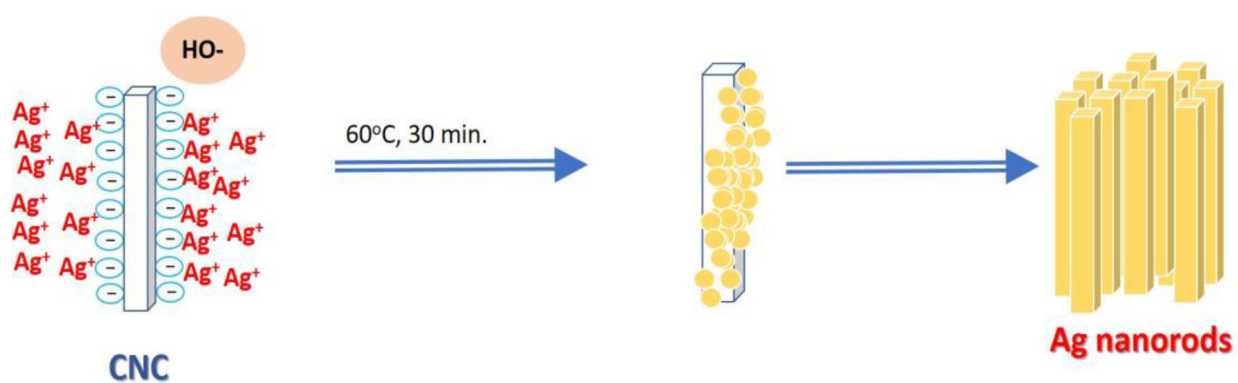


Figure S9. Formation of Ag nanorods by the CNC.

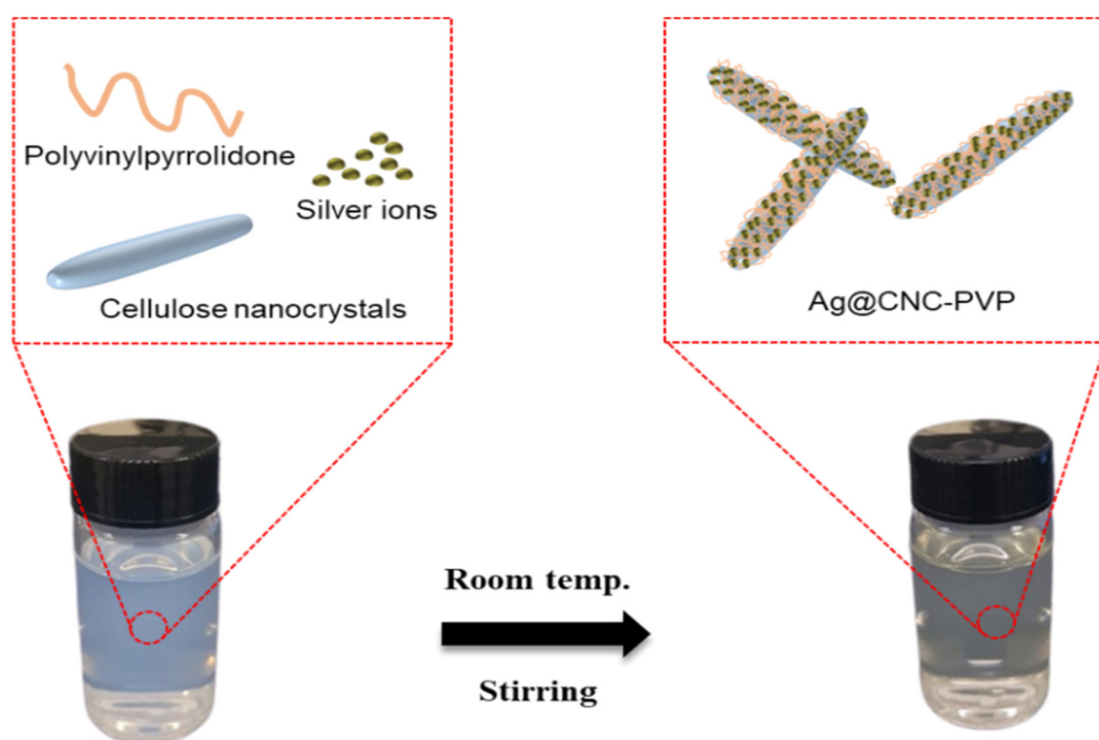


Figure S10. Schematic illustration of the one-pot fabrication process of CNCs-PVP-Ag nanohybrid.

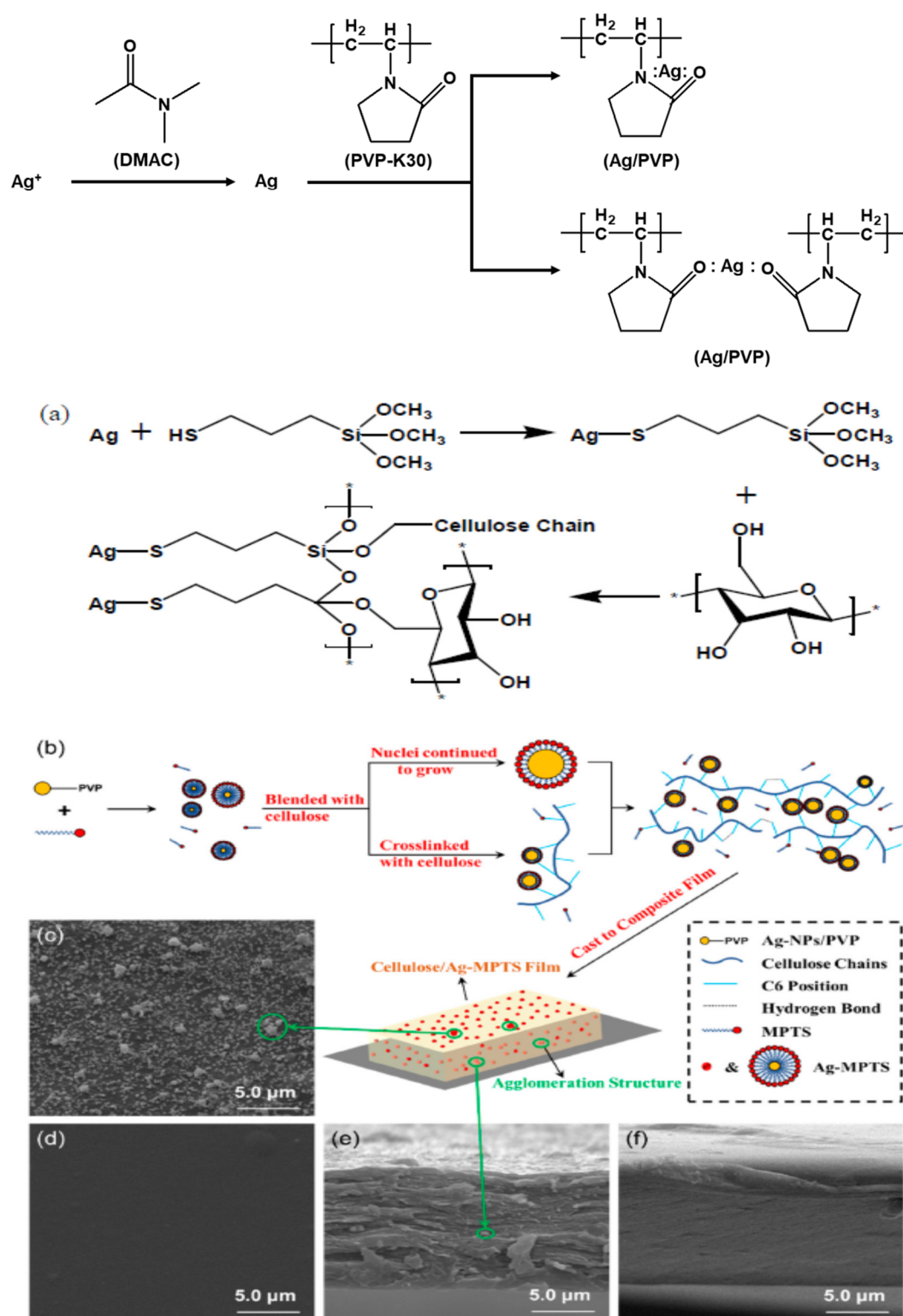
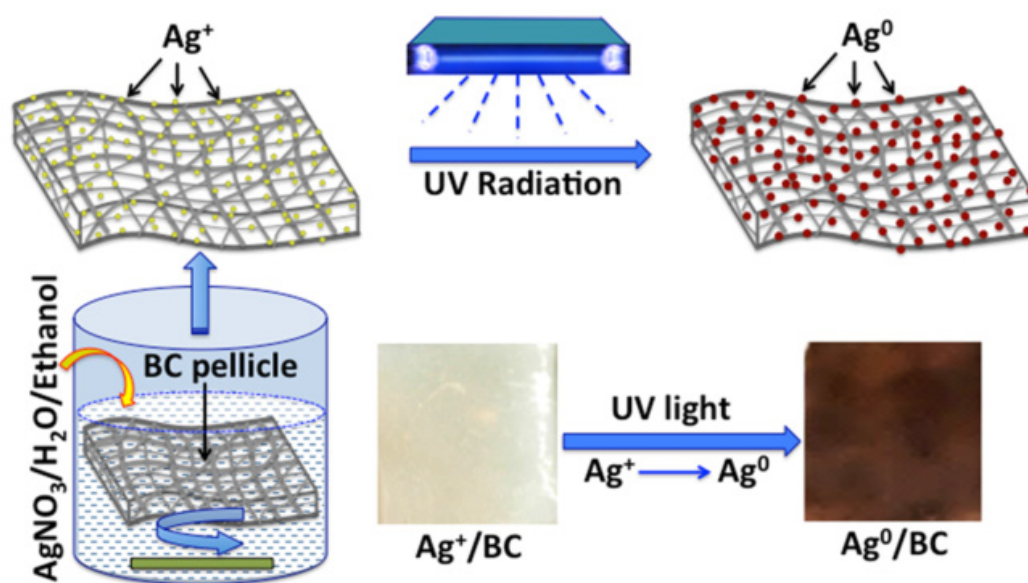


Figure S11. Reaction process and surface morphology of films: (a) Reaction scheme of Ag-MPTS-Cellulose cross-linked structure; (b) Reaction process of films; (c,e) SEM graphs of RCF and CANF0.04 surface; (d,f) SEM graphs of RCF and CANF0.04 cross-section.



^aPhotographs of pellicles before and after UV irradiation are also presented.

Figure S12. Artwork of silver nanoparticles formation on the bacterial cellulose matrix (Pal, Nisi, Stoppa, & Licciulli, 2017).

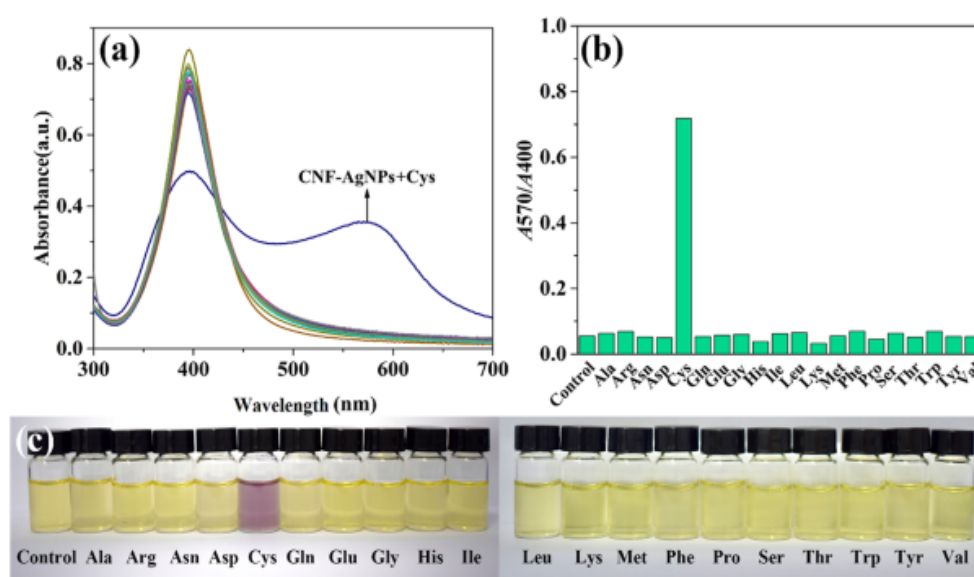


Figure S13. UV-vis spectra of CNF-AgNPs mixed with 20 different amino acid.

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