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Supporting Information

Construction of heterostructured g-C_3N_4/ZnO/cellulose and its antibacterial activity: experimental and theoretical investigations

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Experiment Section

Colony forming count method

Colony forming count method was applied for antibacterial activity study as followed: E. coli and S. aureus grew over night in the Nutrient Agar (NA) broth (composed of beef extract, peptone, sodium chloride and agar). The pH of NA broth was adjusted to 7.0 by sodium hydroxide solution. And then we prepared the Nutrient Broth (NB) (compositions of NB beef extract, peptone and sodium chloride). CNZCel was dispersed in 9 mL NB broth by ultrasound for 1 h. Then the mixture of NB and CNZCel was sterilized at 121 ^{o}C for 30 min. Each of samples was inoculated aseptically with 1 mL serially diluted bacterial suspension (the initial bacterial concentration is approximate 400×10^{8} CFU·mL^{-1}). The concentration of CNZCel in the mixture was 0.55 mg·mL^{-1} and 0.60 mg·mL^{-1} (only the mass of ZnO and g-C_3N_4 were calculated) against S. aureus and E. coli, respectively. Next, the samples were incubated at 37 ^{o}C for 24 h under an ultraviolet lamp with 6 W (WFH-203, Shanghai JingKe Industrial co., Ltd). Finally, 100 μL mixtures were spread on NA broth in petri plate. The plates had been incubated at 37 ^{o}C for 24 h under the ultraviolet irradiation. The blank experiment was carried out with same method without additions of CNZCel or ZCel.

Disc diffusion method

A tube of fresh bacteria was used to prepare the bacterial suspension. 150 μL diluent bacterial suspensions were pipetted to culture dish. To ensure the spread of bacterial on the surface, we swabbed the surface of medium three times by sterile swabs. The CNZCel composites with 6 mm were put into the central of medium. All the culture dishes were incubated at 37 ℃ for 18-24 h under an ultraviolet lamp with 6 W. The diameters of inhibition zones were measured at 3-equidistant points taken from the center of the inhibition zone and the average value was recorded. All experiments were carried out in triplicate.

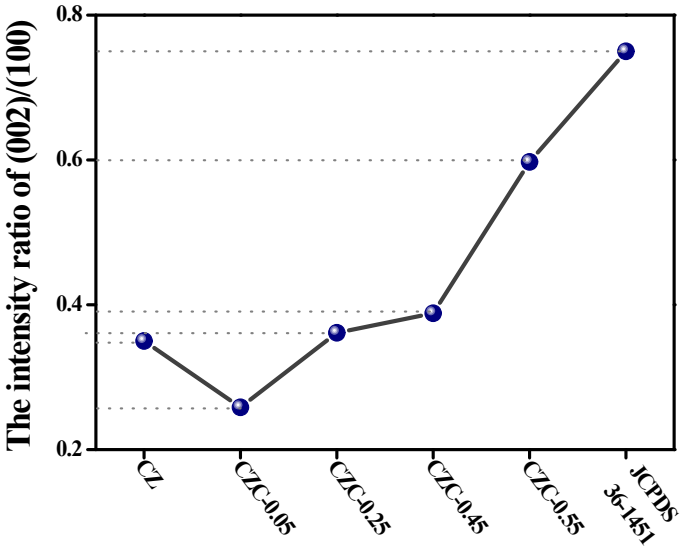

Fig. S1. The (002)/(100) intensity ratios of CZ and CZC composite.

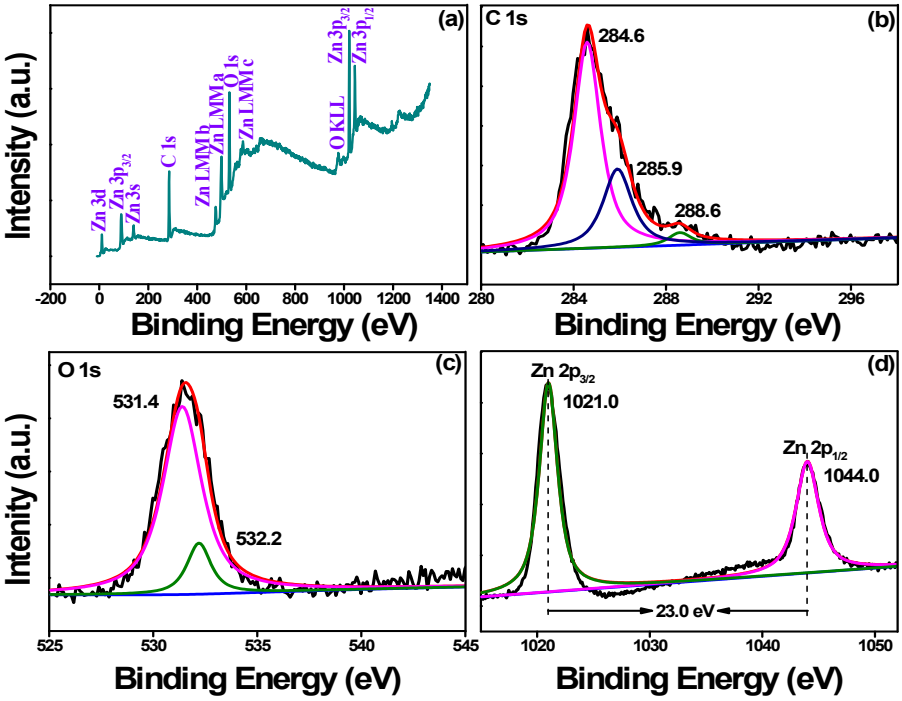

Fig. S2. XPS spectra of ZnO/cellulose: (a) survey, (b) C 1s, (c) O 1s and (d) Zn 2p.

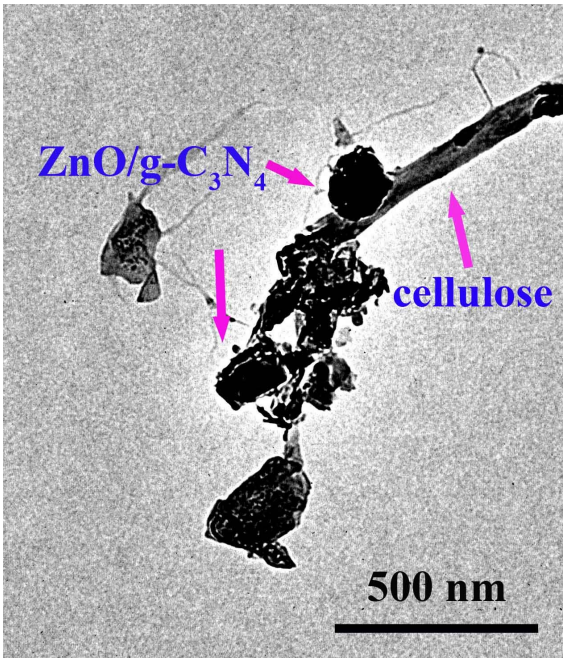

Fig. S3. TEM image of CNZCel-0.55 composite.