**Electrospinning of PAN/Ag NPs nanofiber membrane with antibacterial properties**

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**A. EDS analysis**

The surface contents of PAN composite nanofibers were detected by EDS in Fig.S1. The main elements of the fiber surface are C, N and O, which show the element content on the surface of PAN. Compared with the original PAN nanofibers, the presence of Ag was detected on the surface of PAN composite nanofibers ((b), (c)) with nano-silver. With the increase of silver content, the content of Ag in PAN/Ag NPs (3%) was higher than that in PAN/Ag NPs (1%). EDS analysis showed that the signal of silver atom was stronger and that of N atom was weaker, implying the chelating effect of silver nanoparticles with cyano group of PAN.



**FIG.S1** (a) EDS spectra of PAN nanofibers, (b) PAN/Ag NPs (1%) nanofibers, and (c) PAN/Ag NPs (3%) nanofibers.

**B. XPS analysis**

In order to further prove the existence of silver nanoparticles on the surface of PAN nanofibers, XPS analysis was performed as shown in Fig.S2. (a), (d), (h) are the broad spectra of PAN, PAN/Ag NPs (1%) and PAN/Ag NPs (3%) respectively. There are no changes in C1s, N1s and O1s, but a new characteristic peak of Ag3d appears in the fibers with nano-silver. It was found that the N1s elements were (b), (e), (i) in the wide scanning spectra. The PAN nanofibers had only one characteristic peak at 398.7 eV, corresponding to the cyano group. O1s elements were (c), (f), (j) in the wide scanning spectra. PAN nanofibers had two characteristic peaks at 531.4 eV and 533.2 eV respectively, which were C=O and C-O on the ester group. Graphs (g) and (k) detect the Ag3d elements of PAN/Ag NPs (1%) and PAN/Ag NPs (3%) respectively. Ag3d5/2 and Ag3d3/2 are at 368eV and 373eV respectively. What’s more, with the addition of the concentration of silver nanoparticles, the peak of Ag3d was higher.



**FIG.S2** XPS wide-scan, C1s and N1s core-level spectra of ((a)–(c)) of PAN, ((d)–(f)) PAN/Ag NPs (1%), ((h)–(j)) PAN/Ag NPs (3%) (the inset image of ((g),(k)) is the core-level Ag3d spectrum) of PAN/Ag NPs (1%) and PAN/Ag NPs (3%), respectively.