Supplementary information

Transmittance of the chitosan film

Transmittance of the bare chitosan film used in this work at 550nm wavelength is around 91% as shown in Figure S1.

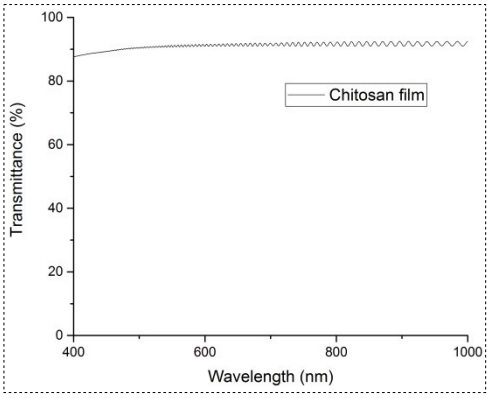

Figure S1. Transmittance of the chitosan film at different wavelength

Tape test

Kapton tape was pressed onto each of the film with a pressure around 200KPa for 5s, and then the tape was peeled off slowly. The SEM images were taken before and after the tape test for all three AgNW networks. For the tape tests on the AgNW/chitosan composite film fabricated in this work, the sheet resistance of the film was measured for ten peeling cycles of tape tests. The SEM images before and after the tape tests are shown in Figure S2a and S2b, respectively. From the two SEM images, no observable changes in AgNWs density or morphology of the networks can be detected.

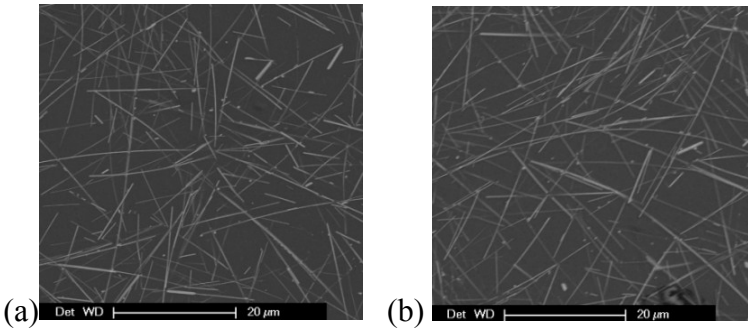

Figure S2. Surface morphology of the AgNW/chitosan composite film (a) before and (b) after tape test.

As a comparison, tape tests were also performed on the glass substrate sprayed with AgNWs to test the adhesion of AgNWs on glass. After the tape test for one peel cycle, the sheet resistance of the sample increases from 5.7Ω/sq to a value too large to be measured, and this suggests that AgNWs cannot form an interconnected network after the test. The huge rise in sheet resistance is also supported by the SEM images taken before and after the tape test as shown in Figure S3a and S3b, respectively. Before the tape test, large amount of AgNWs are densely distributed on the glass substrate. However, after the tape test, only very limited AgNWs remain and the network connection disappears.

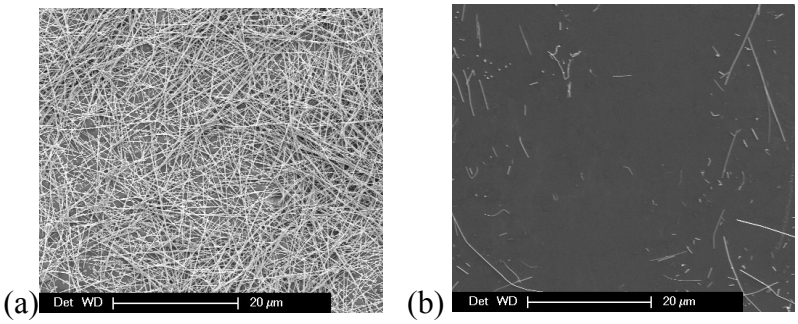

Figure S3. Surface morphology of the glass sprayed with AgNWs (a) before and (b) after tape test.