

Mechanical properties of single silver nanowire for the transparent EMI shielding films of flexible devices

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Recently, the product trends of flexible devices (FDs) have been rapidly moved from curved to foldable devices due to the increase in demands for portable devices. It is required to the high deformation limitations for the transparent EMI shielding films.

The conventional ITO films are fragile and tend to electrically break down when the radius of curvature becomes lower than 5 mm which is the critical radius of curvature required for foldable devices. Thus, there is an increasing need for new transparent conductive materials with high mechanical flexibility.

In our study, the mechanical limitations of silver nanowire (Ag NWs) for flexible devices were investigated by tensile and buckling deformations. The elastic fracture of the Ag NW at ~2.5% strain was shown in the tensile stress mode, and in the buckling stress the critical radius of curvature was greatly extended to a few micron ranges. It indicates that the resistance to deformation of the Ag NW films is better than ITO films.