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Ag Nanofibers with Ultrahigh Aspect Ratios Fabricated by Catalytic Reduction of Solution Blowspun $AgNO_3$/PVA/PVP-mixed Nanofibers

Xu ZHAO*, Chiho ONODERA* and Mikio MURAOKA*

* Department of Systems Design Engineering, Akita University, Akita 010-8502, Japan
E-mail:zhao@gipc.akita-u.ac.jp (X. Z)

Ag nanofiber (NF)-based networks have attracted significant attention as next-generation flexible conductive materials. Ag NFs with high aspect ratios decrease the number density required for percolation; hence, they form qualitatively superior conductive films. Previously, we developed a novel method for fabricating Ag NFs via Pt nanoparticle-assisted hydrogen-free reduction of Ag^+- containing polymers. This method enables rapid preparation of Ag NFs in high yields. Electrospinning was utilized for producing Ag^+-containing precursor NFs. Nevertheless, it was difficult to achieve Ag NFs with high aspect ratios due to fiber discontinuity resulting from the limited amount of Ag^+ in the electrospinning solution. In this study, in order to improve the previous method, highly concentrated $AgNO_3$-containing polymer NFs were produced using solution blowspinning instead of electrospinning. Ag NFs with ultrahigh aspect ratios of over 10^5 were fabricated via catalytic reduction of solution blowspun $AgNO_3$-containing polymer NFs. Ag NF networks with low sheet resistance were produced, thereby demonstrating their potential applicability as flexible transparent electrodes and transparent film heaters.

Keywords : Ag nanofiber, Aspect ratio, Solution blowspinning, Catalytic reduction