

## Highly conductive and biocompatible soft rubber composite using ultra-long Ag-Au core-sheath nanowires

한상인<sup>1,2</sup>, 현택환<sup>1,2,†</sup>

<sup>1</sup>Institute for Basic Science; <sup>2</sup>Seoul National University  
([thyeon@snu.ac.kr](mailto:thyeon@snu.ac.kr)<sup>†</sup>)

Intrinsically stretchable conductors are emerging as a key component in soft bioelectronics such as wearable and/or implantable devices. The high conductivity of the stretchable conductors is critical to achieve excellent device performance and low power consumption. Material biocompatibility and high softness are also essential requirements in bioelectronics. To accomplish these goals, we here in report a novel nanocomposite composed of ultra-long gold-coated silver nanowires in the elastomeric block-copolymer matrix (Ag-Au nanocomposite). The Ag-Au nanocomposite exhibits the conductivity of 41,850 S/cm. The thick gold sheath deposited evenly on the surface of the ultra-long silver nanowire prevents oxidation and leaching of silver ions which becomes compatible with bio-systems. In addition, the microstructure formed by phase separation of the Ag-Au nanocomposite leads to the soft mechanical property despite a high content of the conductive filler. Using our nanocomposite we could successfully develop wearable and implantable soft bioelectronic devices.