Nanostructured surfaces

Electrical properties of metal-semiconductor structures with new poly(propylene glycol)-b-polystyrene block copolymer nanofibers interfacial layer

M. Gökçen[1], M. Yıldırım[1], A. Allı[2], S. Alli[2,3]

[1] *Physics Department, Faculty of Arts and Sciences, Düzce University, Düzce, Turkey*
E-mail: muharremgokcen@duzce.edu.tr

[2] *Chemistry Department, Faculty of Arts and Sciences, Düzce University, Düzce, Turkey*

[3] *Chemistry Department, Faculty of Arts and Sciences, Bülent Ecevit University, Zonguldak, Turkey*

Au/poly(propylene glycol)-b-polystyrene/n-Si and Au/poly(propylene glycol)-b-polystyrene($HAuCl_4$ dispersed)/n-Si structures were fabricated basis on Si single crystal wafer. Newly synthesized [1] poly(propylene glycol)-b-polystyrene block copolymer interfacial layer was formed onto Si wafer with electrostatic spraying system. The average fiber diameter for poly(propylene glycol)-b-polystyrene nanofibers is obtained about 250 nm through Scanning Electron Microscope (SEM) micrographs. For the purpose of investigating electrical characteristics of these structures, current-voltage (I-V) measurements were conducted at room temperature. The series resistance, shunt resistance, ideality factor, reverse saturation current and zero-bias barrier height of the structures were extracted from forward-bias I-V data. Series resistance and barrier height values of the structures were also calculated using Norde's method [2]. Also, current conduction mechanisms (CCMs) and the density of interface states of the structures were investigated. It was found that several CCMs are dominant in the whole forward bias region utilizing ln(I)-ln(V) plots of the structures.

1. *Allı A., Hazer B., Menceloğlu Y.Z., Süzer Ş.*, Synthesis, characterization and surface properties of amphiphilic polystyrene-b-polypropylene glycol block copolymers // Eur. Polym. J. -2006.-42.-p.740-750.
2. *Gökçen M., Yıldırım M., Demir A., Allı A., Allı S. and Hazer B.*, UV illumination effects on electrical characteristics of metal-polymer-semiconductor diodes fabricated with new poly(propylene glycol)-b-polystyrene block copolymer // Composites Part B -2014.-57.- p.8-12.