S1-3.1

Surface Modification of PVDF Copolymer Nanofiber by Chitosan/Ag(NP)/Nanosilica Composite

M. Nasir[1], R.I. Sugatri[1], and D.M. Agustini[2]

[1]*Research Unit for Clean Technology, Indonesian Institute of Sciences (LIPI), Jalan Cisitu Sangkuriang, Bandung, West Java, Indonesia*
[2]*Department of Chemistry, Jendral Achmad Yani University (Unjani), Cimahi, West Java, Indonesia*

PVDF copolymer nanofiber showed good chemical, mechanical and high hydrophobicity properties. PVDF copolymer nanofiber can be modified and functionalized by introducing hydrophilic and antibacterial materials such as chitosan composite. In this work, PVDF copolymer nanofiber with an average diameter 427.00 nm was modified by dip-coating process by using mixture of chitosan/Ag(NP)/nanosilica. Chitosan/Ag(NP)/nanosilica/PVDF copolymer nanofiber composite was successfully synthesized after analysis and confirmed by using ATR-FTIR spectroscopy, scanning electron microscopy (SEM), water contact angle and water spreading time analysis. SEM analysis showed the diameter of chitosan/Ag(NP)/nanosilica/PVDF copolymer nanofiber has an average diameter 443.50 nm. Post dip coating, it was found the specific vibration band peak IR spectrum which identify the presence of chitosan, SiO_2, and the shifting band peak which was caused by interaction between chitosan and Ag^0 in nanofiber composite. Chitosan/Ag(NP)/nanosilica/PVDF copolymer nanofiber composite with different content of nanosilica have lower water contact angle than pristine PVDF copolymer nanofiber. Water contact angle of PVDF copolymer nanofiber, chitosan/Ag(NP)/nanosilica (0.05%)/PVDF copolymer nanofiber and chitosan/Ag(NP)/nanosilica (0.20%)/PVDF copolymer nanofiber were 108°, 60° and 77°, respectively. Water spreading time analysis showed that modified PVDF copolymer has faster water spreading time than pristine PVDF copolymer nanofiber. It meant modification of PVDF copolymer nanofiber by chitosan/Ag(NP)/nanosilica gave hydrophilic and antibacterial properties to nanofiber.