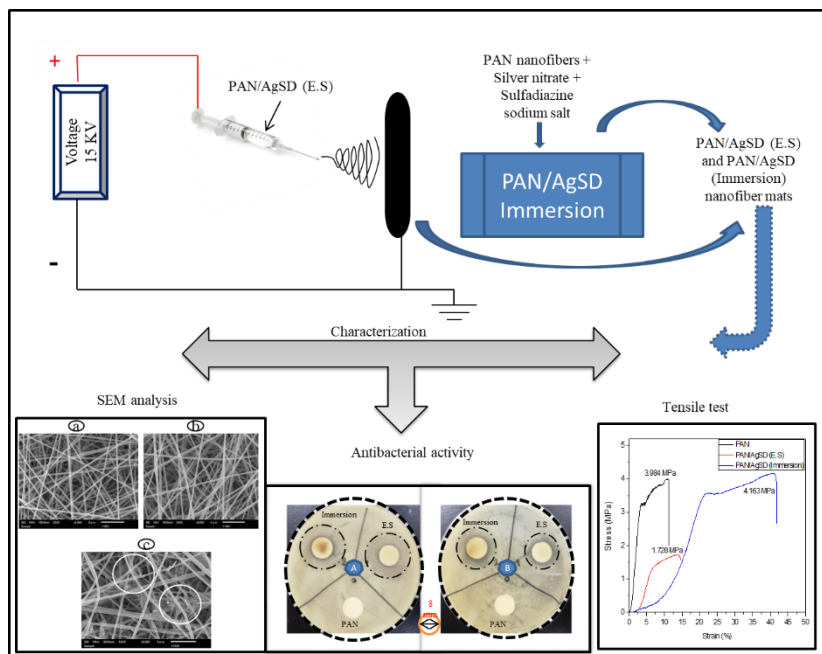


Comparison of antibacterial and structural properties of In Situ and self-synthesized impregnation of AgSD in PAN nanofibers

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Abstract

In this report mechanical, structural, and antibacterial properties of PAN nanofibers incorporation with silver sulfadiazine are mainly focused. Silver sulfadiazine (AgSD) was loaded for the first time on electrospinning as well as self-synthesized AgSD on PAN nanofibers by solution immersion method and then compared the results of both. Antibacterial properties of nanofiber mats were investigated by disc diffusion method. *E.coli.* and *Bacillus* bacteria strains were used as gram-negative and gram-positive respectively. Zone inhibition of the bacteria was used as a tool to determine effectiveness of AgSD released from PAN nanofiber mats. Morphological and surface properties of prepared nanofiber mats were characterized by Scanning Electron Microscope (SEM), and it resulted in uniform nanofibers without bead formation. Diameter of nanofibers was slightly increased with addition of AgSD by in situ and immersion methods respectively. Nanoparticles distribution was analyzed by Transmission Electron Microscopy (TEM). Thermal properties were analyzed by Thermogravimetric Analyzer (TGA), and it was observed that all prepared nanofiber mats were stable above 220°C. Structural properties were characterized by UTM, XRD, XPS, and FTIR as well. It was concluded that self-synthesized AgSD showed better antibacterial, mechanical, and thermal properties.



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