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Enhancement of piezoelectric properties of nanofibers and nanocomposite membranes through corona treatment MUJIBUR KHAN, PAPIA SULTANA, Georgia Southern University, MOHAMMADSADEGH SAADATZI, MALIK TAHIYAT, TANVIR FAROUK, SOURAV BANERJEE, University of South Carolina — Nanofiber (NF) membranes of Poly (vinylidene fluoride) (PVDF), multi-wall carbon nanotube (MWCNTs) reinforced PVDF and Polyacrylonitrle (PAN) were treated by a direct current driven corona discharge at 6 kV and 1mA at a distance of 1 cm. The membranes were corona treated (1.5 hours) heat treated at 100^0C (1 hour), and to corona and heat combined. The corona discharge was from the sample. The samples were characterized using scanning electron microscopy (SEM), Fourier transformed infrared (FTIR) and Raman spectroscopy. The FTIR of the untreated PVDF NFs showed a peak signal at 796cm^{-1} (α-phase), which was absent in the treated samples. The Raman spectroscopy of the corona treated PVDF NFs showed a distinct shift from 873cm^{-1} to 877cm^{-1} (β-phase). Electro Paramagnetic Resonance (EPR) showed the intensity of free radicals increases by 8% with corona treatment. Drop ball tests were performed to measure the piezoelectric response of the NF membranes. The piezoelectric coefficient (d_{33}) of the pristine PVDF NFs was increased from 0 to 102 pC/N due to the heat and corona treatment., The increase was from 0 to 52 pC/N for MWCNT reinforced PVDF NFs. PVDF samples showed the highest d_{33}, while the MWCNT reinforced PVDF showed the maximum capacitance (0.93 nF).

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