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Electrical properties of semi-conductive yarns based polyaniline for wearable ammonia detection

Semi-conductive yarns have been developed for wearable gas sensor applications. Three types of semi-conductive yarns based polyester, rayon and cotton fiber are prepared by dip coating process in polyaniline solutions. The structure and surface morphology of semi-conductive yarns are analyzed by fourier transformed infrared spectroscopy and scanning electron microscope. The results showed that polyaniline is highly adsorbed onto cotton yarn compared with rayon and polyester. The electrical resistivity of cotton and rayon yarns coated polyaniline are found to be 0.299 ± 0.121 M\Omega/cm and 0.794 ± 0.437 M\Omega/cm, respectively, while polyesters exhibited very high resistivity. For the gas sensing properties, the semi-conductive cotton yarns are sawed onto the fabric and tested under ammonia gas environment. The results exhibited that their electrical resistivity is strongly depended on the ammonia gas concentrations operable at room temperature.

Author: INDARIT, Naraporn (Thammasat University)

Presenter: INDARIT, Naraporn (Thammasat University)

Track Classification: Other related topics