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Textile Gas Sensor based PANi/PEDOT:PSS Coated on Cotton Yarn for Ammonia Detection

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In this work, we report the textile-based gas sensor for ammonia (NH_3) detection using PANi/PEDOT:PSS coated on commercially cotton yarn. A laye- by-layer of textile-based gas sensor was prepared by a facile dip coating of poly(3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT:PSS) on the cotton yarn surface followed by coated a layer of polyaniline emeraldine base (PANi) on the top of the device. For this device structure, the PEDOT:PSS was proposed as a hole transport layer, while the PANi acted as an sensitive layer. The PANi/PEDOT:PSS sensor exhibits a low base resistance $\approx$ 5 kΩ and good sensing response to NH_3 gas at room temperature. In comparison to PEDOT:PSS sensor, the PANi/PEDOT:PSS sensor has higher sensing response with faster response and recovery times. Moreover, the device show approximately linear increased as NH_3 gas concentration was increased. These results indicate that this proposed sensing device structure is possible to apply as an environment ammonia monitoring.

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