

## 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 ( $\text{NH}_3$ ) detection using PANi/PEDOT:PSS coated on commercially cotton yarn. A layer-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 coating 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 a sensitive layer. The PANi/PEDOT:PSS sensor exhibits a low base resistance  $\approx 5 \text{ k}\Omega$  and good sensing response to  $\text{NH}_3$  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 shows approximately linear increase as  $\text{NH}_3$  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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