A Novel Method to Detect Alcohol Vapors Based in the Polymeric Nanofiber PEDOT-PSSA

Casillas, Marialis

The fast detection of toxic gases traces in an inadequately ventilated environment is crucial to effectively reduce any widespread loss of life and property. This requires sensors capable of detecting small quantities of alcohol vapors, such as those fabricated using nanofibers that possess enhanced surface to volume ratio. Electrospinning is a useful and efficient technique to produce ultrafine polymeric fibers. Electrospun isolated nanofibers of poly(3,4-ethylenedioxythiophene) doped with poly styrene sulfonic acid(PEDOT-PSSA) were used to sense vapors. The hypothesis was: If the gas sensor based on polymeric nanofibers PEDOT-PSSA detects alcohol vapors, then the application of an electric current will be effective for visual detection during the exposure of methanol, ethanol, and propanol because their relationship to the surface area and their response time at a higher rate. Due to the large surface to volume ratio and small quantity of active material used in their fabrication, this sensor have a faster response time (16s) and had the ability to perform a visual detection when the electric current was applied; while the commercial sensor have a slower response time (5,700s). The advantage of using a single nano?ber chemical sensor is its small size and potential for higher sensitivity. Finally, the ability to prepare long nano?bers of PEDOT-PSSA have a large aspect ratio and an even larger surface to volume ratio. The hypothesis was accepted, electrospinning is a simple and inexpensive method of preparing PEDOT-PSSA nanofibers making it an attractive technique to fabricate polymers based, low cost, fast response, and reusable gas sensors.

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