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Electrospun Conducting Polymer/Graphene Composite Nanofibers for Gas Sensing Applications

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Abstract : Nowadays, the development of poisonous gas detectors is considered to be an urgent matter to secure human health and the environment from poisonous gases, in view of the fact that even a minimal amount of poisonous gas can be fatal. Of these concerns, various inorganic or organic sensing materials have been used. Among these are conducting polymers, have been used as the active material in the gassensorsdue to their low-cost,easy-controllable molding, good electrochemical properties including facile fabrication process, inherent physical properties, biocompatibility, and optical properties. Moreover, conducting polymer-based chemical sensors have an amazing advantage compared to the conventional one as structural diversity, facile functionalization, room temperature operation, and easy fabrication. However, the low selectivity and conductivity of conducting polymers motivated the doping of it with varied materials, especially graphene, to enhance the gas-sensing performance under ambient conditions. There were a number of approaches proposed for producing polymer/graphene nanocomposites, including template-free self-assembly, hard physical template-guided synthesis, chemical, electrochemical, and electrospinning…etc. In this work, we aim to prepare a novel gas sensordepending on Electrospun nanofibers of conducting polymer/RGO composite that is the effective and efficient expectation of poisonous gases like ammonia, in different application areas such as environmental gas analysis, chemical-,automotive- and medical industries. Moreover, our ultimate objective is to maximize the sensing performance of the prepared sensor and to check its recovery properties.

Keywords : electro spinning process, conducting polymer, polyaniline, polypyrrole, polythiophene, graphene oxide, reduced graphene oxide, functionalized reduced graphene oxide, spin coating technique, gas sensors
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