Sensing methods for hazardous phenolic compounds based on graphene and conducting polymers-based materials

ABSTRACT

It has been known for years that the phenolic compounds are able to exert harmful effects toward living organisms including humans due to their high toxicity. Living organisms were exposed to these phenolic compounds as they were released into the environment as waste products from several fast-growing industries. In this regard, tremendous efforts have been made by researchers to develop sensing methods for the detection of these phenolic compounds. Graphene and conducting polymers-based materials have arisen as a high potential sensing layer to improve the performance of the developed sensors. Henceforth, this paper reviews the existing investigations on graphene and conducting polymer-based materials incorporated with various sensors that aimed to detect hazardous phenolic compounds, i.e., phenol, 2-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichlorophenol, pentachlorophenol, 2-nitrophenol, 4-nitrophenol, 2,4-dinitrophenol, and 2,4 dimethylphenol. The whole picture and up-to-date information on the graphene and conducting polymers-based sensors are arranged in systematic chronological order to provide a clearer insight in this research area. The future perspectives of this study are also included, and the development of sensing methods for hazardous phenolic compounds using graphene and conducting polymers-based materials is expected to grow more in the future.