

Sensors based on graphene and its derivatives

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The main difference of sensor technologies from traditional instrumental analysis approaches is their orientation to the final product - a sensor, which allows to perform a qualitative and quantitative analysis in real time. Graphene and its derivatives have a high potential for use in a fabrication of a wide variety of sensors. This is due to the fact that an electrical resistance of graphene and its derivatives films is very sensitive to external factors. Even individual molecules of certain chemical substances falling on the graphene films, lead to a noticeable change in electrical resistance and an especially significant change cause molecules capable to act as donors or acceptors. Graphene oxide has properties of selectivity, which are achieved by combining the oxygen functional groups leading to a change of mechanisms of the films interaction with different molecules. The unique properties of graphene materials, in general, including low cost and relative ease way of production by the chemical method, enable to develop of advanced sensor systems based on modified graphene.

In this study we provide information about different sensors based on graphene and its derivatives: gas, chemical, mechanical, biological, optical, pressure, humidity, strain. One of the most popular use of biosensors is DNA diagnostics - one of the most advanced analytical techniques.

The distinctive features of biosensors is their small size, relatively low cost, high speed, selectivity and sensitivity of DNA, as well as the possibility of miniaturization and fabrication of portable devices for rapid diagnostic tests of diseases in clinical laboratories.