

Wireless Portable Graphene-FET Biosensor for detecting H1N1 virus

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Abstract

It has been proved that influenza or H1N1 virus can be transmitted through droplet spread from cough and sneeze. It is a highly contagious disease. Therefore, it is an important issue to design a Biosensor to detect influenza. As shown in figure 1, In order to achieve this goal, this study design a field-effect transistor by Micro-electromechanical system (MEMS) to utilize Graphene which is modified with aptamer as a transistor channel. The fabrication of Graphene-FET Biosensor is shown in figure 2. When particle of virus is adsorbed by the aptamer, it results in changes of electrical properties. The concentration of virus can be detected now is about 1 ng/ml, as shown in figure 3.

Besides, the present study designs a small portable air collection device. Being proved by the experiment, the portable air collection device has collecting function in any distance. The result is illustrated in figure 4. Therefore, it is able to integrate a small portable air collection device with a portable field-effect transistor of biological Sensing which is high sensitive and biospecific. This device will integrate with wireless communication technology of Bluetooth in the future. It can transmit the measured signal directly to the cell phone to understand the situation of disease sources in order to achieve the goal for point-of-care (POC).

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Figures

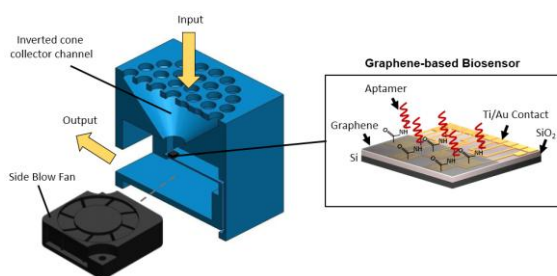


Figure 1. Schematic diagram showing the main components of Graphene-FET biosensor.

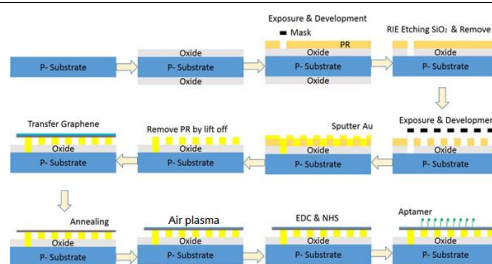


Figure 2. The fabrication of Graphene-FET Biosensor on the wafer.

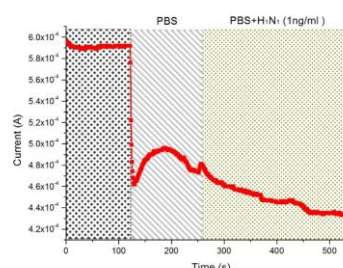


Figure 3. The result of detection of H1N1 Vaccine by Biosensor.

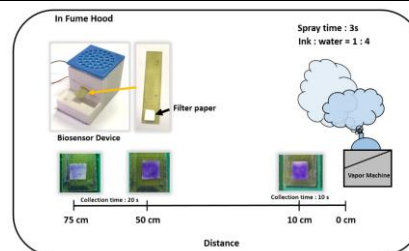


Figure 4 The result of accumulation by the air collection device.