Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **320** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

Development of graphene-based field-effect transistor (GFET) sensors for a simulant of chemical warfare agents

Monday, 7 June 2021 15:55 (5 minutes)

Chemical warfare agents (CWAs) are potential threats to civil society and defence personnel. In recent years, many efforts has been deployed to develop a scalable, rapid and accurate detection system to identify trace amount of CWAs. Here we report a graphene-based field-effect transistor (GFET) sensor able to detect 800 ppb of dimethyl methyl phosphonate (DMMP), a simulant of the nerve agent sarin. We observe enhanced sensitivity when the GFET sensor is exposed to few mWs of UV light. Back gate measurements performed before and during exposures to the analyte allow us to investigate the sensing mechanism while monitoring the induced changes in carrier concentration and mobility in graphene.

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Session Classification: M3-8 Applied Physics (DAPI) / Physique appliquée (DPAI)

Track Classification: Applied Physics and Instrumentation / Physique appliquée et de l'instrumentation (DAPI / DPAI)