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Fabrication and Application of Field Effect Transistor

Guest Editor:

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Deadline for manuscript submissions:
closed (15 February 2022)

Message from the Guest Editor

Dear colleagues,

Developing biosensors that provide accurate, real-time information of one or multiple analytes is at the heart of next-generation medical devices for personalized medicine, such as point-of-care measurements, wearable sensors, and implantable bioelectronics. Field-effect transistors (FETs) have unique properties and advantages toward applications for biosensing, including label-free detection, low detection limits, real-time sensing, and straightforward integration with standard semiconductor processing. FET biosensors are typically constructed by immobilizing environmental sensitive chemical and biological molecules on the surfaces of semiconducting channels or gate electrodes, such as pH-sensitive molecules, antibodies, enzymes, and aptamers. Upon interactions with target molecules, receptors induce electronic signals in FETs, such as changes in channel conductance, source-drain current, threshold voltages, and device capacitance. Novel fabrication approaches, including different device designs, synthesis of novel materials, and unconventional fabrication approaches, have been proposed to enable advanced applications needed for biosensors.

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Editor-in-Chief

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