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Synthesis and Fabrication of Silicon Nitride Nanopore Device for Biomolecule Detection

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Diabetes has been one of the major health issues worldwide and also in Thailand. More importantly, almost half of those with diabetes are undiagnosed. Although various test methods have been developed, the existence of anemia and thalassemia may cause inaccuracy in the diabetes mellitus testing from blood. An alternative biomarker molecule is glycated albumin which directly corresponds to the diabetes mellitus. Aim of this work is to utilise nanopore technology to detect level of the glycated albumin. The nanopore was fabricated by Focus Ion Beam technique on a 70 nm thick silicon nitride membrane. The testing system composes of 2 solution chambers separated by the silicon nitride nanopore. Electrochemical technique was performed for 2 purposes, 1) to identify the existence of the nanopore and 2) to determine the analyte shape, charge, and concentration from the ionic current profile during the analysis. Preliminary results suggested that the glycated albumin could be detected by the 100 nm nanopore with electrochemical measurement.

Author: Dr BOONKOOM, Thitikorn (NANOTEC)

Presenter: Dr BOONKOOM, Thitikorn (NANOTEC)

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