

## MOSFET-Type Biosensor for Detection of Streptavidin–Biotin Protein Complexes

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A p-channel metal oxide semiconductor field-effect transistor (PMOSFET)-type biosensor for detecting streptavidin-biotin protein complexes has been fabricated. Au, which has a chemical affinity with thiol, was used as the gate metal in order to form a self-assembled monolayer (SAM). A SAM was used to immobilize streptavidin. The hydroxyl group of SAM was bound with the amine group of streptavidin. Biotin was then injected into the solution to form streptavidin-biotin protein complexes in the solution. Streptavidin and biotin were bound by a high affinity ( $K_a \sim 10^{15} \text{ Mol}^{-1}$ ). Measurements were conducted in a phosphate buffer saline (PBS; pH 6.4, 20  $\mu\text{M}$ ) solution and a Pt electrode was used as the reference electrode. The bindings of SAM, streptavidin, and biotin caused a variation in the drain current of the PMOSFET-type biosensor. To verify interactions among SAM, streptavidin, and biotin, a quartz crystal microbalance (QCM) measurement was performed.

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