Contribution ID: **151** Type: **Poster**

Solution immersed silicon (SIS)-based biosensors for the direct monitoring of small-molecular-weight analytes

Wednesday 20 June 2018 18:00 (20 minutes)

Noise from refractive index (RI) fluctuations of the liquid environment near sensor surface due to factors such as temperature, pressure, and concertation gradient is inevitable in surface plasmon resonance (SPR) sensing technology. As a result, SPR devices are unable for quantitative and qualitative detection of small molecules and low-concentration analytes. To address this issue, novel solution-immersed-silicon (SIS) sensing technology was developed [1]. Near p-wave anti-reflective boundary condition, SIS shows extremely high thickness change sensitivity and inert for RI change of buffer solution. SIS sensor setup is cost effective and contains sensor cell, sample injection drive and signal detection; no sophisticated microfluidics is needed. SIS immunosensor chip is a simple silicon wafer covered with the assembled monolayer. The detection limit of 10 pg/ml of antigens for hepatitis B virus (HBV) and acute myocardial infarction (AMI) in human blood serum [2,3] was achieved with SIS sensors.
Here, we are presenting a study on the interactions of small molecule: protein tyrosine phosphatase (PTP) inhibitors with immobilized protein tyrosine phosphatase 1B(PTP1B). The PTP1B enzyme have high significance in human health, specifically in diabetes and cancer. We have achieved the detection limit of 10 nM without any amplification technique.

[1] M. S. Diware, H. M. Cho, W. Chegal, Y. J. Cho, J. H. Jo, S. W. O, S. H. Paek, Y. H. Yoon, D. Kim, Analyst 140 (2015), 706.
[2] M. S. Diware, H. M. Cho, W. Chegal, Y. J. Cho, D. S. Kim, S. W. O, K. S. Kim, S. H. Peak, Biosens. Bioelectron. 87 (2017), 242.
[3] M. S. Diware, H. M. Cho, W. Chegal, Y. J. Cho, S. W. O, S. H. Peak, D. S. Kim, K. S. Kim, Y. G. Min, J. H. Jo, C. Shin, Biointerphases. 12 (2017), 01A402.

Author: Dr KIM, Dong Hyung (Korea Research Institute of Standards and Science)

Co-authors: Dr CHO, Hyun Mo (Korea Research Institute of Standards and Science); Dr CHEGAL, Won (Korea Research Institute of Standards and Science); Dr CHO, Yong Jai (Korea Research Institute of Standards and Science); Mr O, Sang Won (Korea Research Institute of Standards and Science); Prof. PAEK, Se-Hwan (Korea University); Dr DIWARE, Mangesh S. (Kyung Hee University); Mr MIN, Yoon Gi (Hannam University); Prof. JO, Jae Heung (Hannam University)

Presenter: Dr CHO, Hyun Mo (Korea Research Institute of Standards and Science)

Session Classification: Poster Session Wednesday

Track Classification: Biointerfaces