

## SERS-based Multiplex Immunoassay with Shape-coded Hydrogel Microparticles

함정우, 김현지, 지유진, 김세민, 고원건<sup>†</sup>

연세대학교

(wongun@yonsei.ac.kr<sup>†</sup>)

Bioassays based on surface-enhanced Raman scattering (SERS) represent an efficient tool that can quickly detect even very low concentrations of the target molecule. In this study, shape-coded suspension arrays have been developed for SERS-based bioassays, for the simultaneous detection of multiple targets. The suspension arrays were prepared using different shapes of poly(ethylene glycol) (PEG) hydrogel microparticles, which were prepared by a simple photopatterning process. The resultant hydrogels were coated with silver nanoparticles and then divided into two groups depending on the shape. As a proof of concept, square particles were coated with 4-mercaptophenylboronic acid by self-assembly to detect glucose, while circular particles were functionalized with anti-human serum albumin to detect HSA. The assay was performed in the concentration range of 1 pg/mL to 1 µg/mL for both glucose and HSA without crosstalk. Target specificity was also confirmed from Raman mapping, which shows that each group of particles reveals a different pattern. Moreover, we verified the potential of our method in multiplex immunoassays by quantifying two different antigens using SERS nanotags.