Topic [4] **Poster (O)**

Gold Nanoparticle Preconcentration for Surface Enhanced Raman Scattering in a Microfluidic Chip

Kwang Bok Kim[1], Ji-Hyung Han[2], Hyoungseon Choi[1], Taek Dong Chung[2] and Hee Chan Kim[3,4*]

1. Interdisciplinary Program, Bioengineering Major, Graduate School, Seoul National University, Seoul 110-744, Korea
2. Department of Chemistry, Seoul National University, Seoul 151-747, Korea
3. Department of Biomedical Engineering, College of Medicine, Seoul National University, Seoul 110-744, Korea
4. Institute of Medical & Biological Engineering, Medical Research Center, Seoul National University, Seoul 110-744, Korea

E-mail : hckim@snu.ac.kr

We report a reversible preconcentration of gold nanoparticles (AuNPs) for chemical analysis based on surface-enhanced Raman scattering (SERS) in a microfluidic system. AuNPs homogeneously dispersed in solution were locally preconcentrated by charge-selective ion extraction through a pair of negatively charged polyelectrolyte plugs. This phenomenon created dynamic hotspots among the preconcentrated AuNPs that could be redispersed as required. Hugely intensified SERS signals from the concentrated AuNPs plug in the microfluidic system provided the fingerprint information about the molecules that were adsorbed on the AuNP surfaces or dissolved in the solution phase in reproducible manner. This unique behavior of nanoparticles handled by microfluidics suggests new opportunities for non-invasive and non-destructive monitoring of molecular species in chemical or biological samples, possibly for use during sequential processes on massively integrated chips.

References

[1] H. Chun, T. D. Chung, and J. M. Ramsey, Anal. Chem., 82, 6287-6292 (2010)

[2] K. B. Kim, J.-H. Han, H. C. Kim, and T. D. Chung, Appl. Phys. Lett. 96, 143506 (2010)