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Optical nanoparticles and their surface modification for sensitive multiplex immunoassays

Bong-Hyun Jun

Department of Bioscience and Biotechnology, Konkuk University, Korea

Since sensitive biomolecule detection system has potential uses for early detection and diagnosis of various diseases, there have been considerable interests in the development of multiplex various target detection techniques with sensitive. Among the various techniques, optical encoded nanoparticles have great advantages over planar array-based multiplexing assays. Recently, we have developed several kinds of optical nanoparticles which have metal or semi-conduct nanoparticles assembled nanostructure. The structures can be applied for small molecules, protein detection or for bio-imaging. Optical nanoparticles which are suitable for sensitive and multiplex detection systems will be discussed. Especially, we will focus on Surface-enhanced Raman scattering (SERS) and/or semiconductor probes with their surface modification which have attracted considerable interest for bioanalytical applications. The SERS probes have been rigorously developed for an extensive range of bio-detection applications and have been used for high-throughput screening of biological molecules.