Fiscal Year 2013, Tokyo Institute of Technology ASPIRE League Research Grant

Selected Research Projects in FY2013

Principal Researcher	Name	**Tomohiro HAYASHI**
	Department and graduate school(institute)in Tokyo Tech	Department of Electronic Chemistry, The Interdisciplinary Graduate School of Science and Engineering
	Position	Associate Professor
Co-researchers	HKUST	―
	KAIST	Ki-Hun JEONG, Department of Bio and Brain Engineering Associate Professor
	NTU	Nam-Joon CHO, School of Materials Science & Engineering Associate Professor
	Tsinghua	―
Subject of the research project		**Development of next generation biosensing devices with high sensitivity and selectivity based on surface-enhanced Raman scattering**
Summary of the research project		In this project, we develop a next-generation biosensing device that provides parallel detection of multiplex molecular events at various biointerfaces with high sensitivity based on surface-enhanced Raman scattering (SERS). Prospective applications of this biosensing device are high-speed screening of drugs in the medical field on the application side and analysis of complex molecular processes involving multiple molecules at biointerfaces on the fundamental research side. To develop the above sensing device, there are three primary technical issues: one, the fabrication of biointerfaces where the sensing is carried out; two, the design and fabrication of substrates for SERS spectroscopic measurements with a high enhancement factor; and three, the construction of a measurement system for high-sensitivity measurements. We

	organized a research team consisting of specialists in these three fields. 1. Prof. Namjoon Cho, Nanyang Technological University, Associate Prof.: Fabrication of artificial lipid membranes for biosensing and scaffolds for regenerative medicine 2. Prof. Ki-hun Jeong, Korea Advanced Institute of Science and Technology, Associate Prof.: Design and fabrication of SERS substrates with high enhancement factor, bio-nano machines, and biomimetic optical devices 3. Prof. Tomohiro Hayashi (Applicant), Tokyo Institute of Technology, Associate Prof.: Development of surface & interface analysis techniques, nanophotonics, and scanning probe microscopy The exchange of researchers and students between the groups is indispensable for this research project. Along with the achievement of our research goal, this project will provide graduate school students invaluable study abroad experiences as well as interdisciplinary research experiences, and will lead to the organizing of an international consortium for young scientists and students.