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[\[PDF \(632K\)\]](#) [\[References\]](#)**Development of Interdigitated Array Electrodes with Surface-enhanced Raman Scattering Functionality****[Md. Monirul ISLAM](#)¹⁾, [Kosei UENO](#)¹⁾²⁾, [Saulius JUODKAZIS](#)¹⁾, [Yukie YOKOTA](#)¹⁾ and [Hiroaki MISAWA](#)¹⁾**1) *Research Institute for Electronic Science, Hokkaido University*2) *PRESTO, Japan Science and Technology Agency*

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Interdigitated array electrodes with surface-enhanced Raman scattering (SERS) functionality for *in situ* qualitative and quantitative analysis of electroactive species are demonstrated. Gold nanostructured interdigitated array electrodes (NIDAEs) were fabricated by electron beam lithography, and used for an electrochemical SERS study of $K_3[Fe(CN)_6]$ in aqueous $KClO_4$ solution in single and generation-collection modes. The generation-collection mode experiment showed amplification of the SERS band intensity for adsorbed ferricyanide ions at the negative end of the applied potential, while in single mode it was reduced to near zero. This new finding reveals that NIDAEs offer a new opportunity for analytical science by improving analytical sensitivity and detection ability of electroactive species. The electric fields accumulating at nanogaps are promising for manipulating linear and nonlinear optical phenomena. In addition, miniaturized NIDAEs are of great importance for developing lab-on-a-chip devices, and are useful for measurements within small space/volume domains, requiring only small amounts and/or concentrations of analytes.

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