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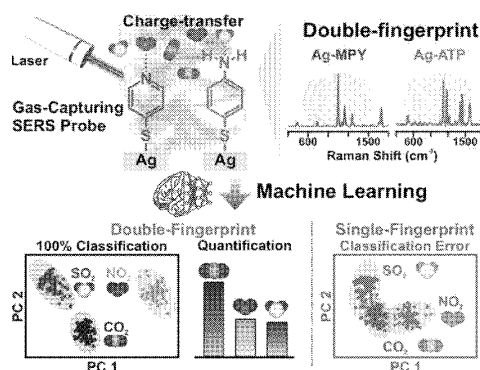
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(54) Title: SURFACE-ENHANCED RAMAN SCATTERING (SERS) PLATFORM FOR ANALYSIS

FIG. 2



(57) **Abstract:** Herein disclosed is a surface-enhanced Raman scattering (SERS) chip for generating multiple SERS profiles simultaneously from one or more analytes suspected to be in a sample. The SERS chip includes one or more substrates, and one or more Raman probes formed on the one or more substrates, wherein each of the one or more Raman probes includes a SERS-active nanoparticle grafted with a receptor molecule, (i) wherein the receptor molecule on each of the one or more Raman probes on one substrate is different from the receptor molecule of the one or more Raman probes on another substrate, and/or (ii) wherein the one or more Raman probes include two or more Raman probes and wherein the receptor molecule on each of the two or more Raman probes on one substrate is different, wherein the receptor molecule includes a thiol group proximal to the SERS-active nanoparticle and a functional group distal to the SERS-active nanoparticle, wherein the functional group interacts with the one or more analytes to induce a change in molecular vibration of the receptor molecule which is identifiable by surface-enhanced Raman scattering for generating the multiple SERS profiles. Herein also discloses a method of identifying one or more analytes suspected to be in a sample, the method includes contacting the surface-enhanced Raman scattering (SERS) chip described in various embodiments of the first aspect with a sample suspected to contain the one or more analytes, collecting SERS signals from the surface-enhanced Raman scattering (SERS) chip which has contacted the sample, constructing a combined-SERS profile from the SERS signals, and providing the combined-SERS profile to a device configured with a model trained to identify the one or more analytes from the combined-SERS profile.

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