SS-001 **<Invited Talk>**

Nanofinger Sensors for Health-related Applications

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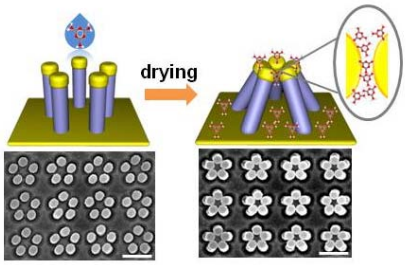
Surface-enhanced Raman scattering (SERS) has long been projected as a powerful analytical technique for chemical and biological sensing applications. Pairing with portable Raman spectrometers makes the technique extremely appealing as real-time sensors for field application. However, the lack of reliable, uniform, low cost and ease-of-use SERS enhancement structures has prevented the wide adoption of this technique for general applications. We have discovered a novel hybrid structure based on the high-density and uniform arrays of gold nanofingers over a large surface area for SERS applications. The nanofingers are flexible and their tips can be brought together to trap molecules to mimic the biological system. We report here a rapid, simple, low-cost, and sensitive method of detecting trace level of food contaminants by using nanofinger chips based on portable SERS technique. We also present here the characterization of surface reaction of target molecules with our gold nanofinger substrates and the effect of nanofinger closing towards SERS performance. This new type of nano-structures can potentially revolutionize the medical and biologic research by providing a novel way to capture, localize, manipulate, and interrogate biological molecules with unprecedented capabilities.



Keywords: Surface-enhanced Raman scattering, sensor, chemical sensor

SS-002 **<Invited Talk>**

Thermoelectric Imaging of Epitaxial Graphene

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Heat is a familiar form of energy transported from a hot side to a colder side of an object, but not a notion associated with microscopic measurements of electronic properties. A temperature difference within a material causes charge carriers, electrons or holes, to diffuse along the temperature gradient inducing a thermoelectric voltage. Here we show that local thermoelectric measurements can yield high sensitivity imaging of structural disorder on the atomic and nanometre scales. Using this imaging technique, we discovered a defect-mediated dimensional evolution of strain-response patterns in epitaxial graphene with increasing thickness.

Keywords: UHV-AFM, thermoelectric, Seebeck effect, graphene, SiC