SERS of DNA bases with carbohydrate stabilized silver and gold nanoparticles

VIJAYALAKSHMI KATTUMURI, MEERA CHANDRASEKHAR, SUCHI GUHA, KATTESH KATTI, RAGHURAMAN KANNAN, University of Missouri - Columbia — The phenomenon of SERS using silver and gold nanoparticles has boosted single molecule spectroscopy research in recent years. Among the various techniques available for synthesizing nanoparticles, generation of carbohydrate stabilized nanoparticles has two advantages: 1) carbohydrate, a biologically benign medium, ensures non-degradation of probe molecules and 2) its gelation property facilitates easy film formation for on-chip bio-sensor applications. We studied the effect of carbohydrate stabilized silver and gold nanoparticles on SERS of DNA bases. Films of probe molecules with and without nanoparticles were casted on a silicon wafer. Comparing with the known Raman scattering cross-section of silicon, relative SERS scattering cross-sections of DNA bases are obtained. The dependence of relative strengths of SERS of DNA bases on the excitation wavelength will be discussed. This work was supported by a grant (RB03-080) from the University of Missouri Research Board, Department of Physics and Radiology.

Vijayalakshmi Kattumuri
University of Missouri - Columbia

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