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Investigation of the Aspect ratio–Surface enhanced Raman excitation relationship on free standing gold nanowire arrays

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Surface enhanced Raman spectroscopy (SERS) has been widely studied as a powerful tool for chemical and biological sensing applications. It is used to probe the structure of molecules adsorbed on the surface of nano sized metallic features such as gold, which exhibit an enhanced optical interaction with visible light. The dramatic increase of 10^4-10^5 on the intensity is the result of collective oscillation of the localized surface plasmons (LSP). This electromagnetic enhancement effects are highest normal to the metal surface. This electromagnetic enhancement effects are highest normal to the metal surface and strongly dependent of the nanowire's size and geometry. Therefore in order to prepare a versatile SERS substrate precise tailoring of nanowire array properties is extremely important.

In this work the SERS efficiency of gold nanowire arrays fabricated via electrochemical routes is investigated with respect to aspect ratio /enhancement relationship. For SERS measurements Rhodamine 6G is chosen as the probe molecule. Three different excitation wavelengths of 532nm, 632nm and 785nm are used respectively to optimize the enhancement maxima. The aspect ratio dependence of the Raman enhancement is determined. Furthermore polarization angle dependence of nanowire arrays with respect to SERS efficiency is studied.

Biography

Z. Beril Akinci has completed her M.Sc. in Materials science and engineering in collaboration with molecular biology and genetics department at Istanbul Technical University. She currently is pursuing her Ph.D. in the same department. She has one published paper and several national and international conference presentations.

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