Gmail **Subhendu Chandra <subhendu170975@gmail.com>**

Re: special issue on Raman Spectroscopy/joydeep72_c@rediffmail.com

joydeep chowdhury <joydeep72_c@rediffmail.com> Tue, Oct 2, 2018 at 8:06 PM
To: vinod Kumar Rastogi <v_krastogi@rediffmail.com>, subhenduchandra <subhenduchandra@yahoo.com>, subhendu170975 <subhendu170975@gmail.com>

Dear Professsor Rastogi:
Thanks for you email. I am in India now and will see you in Mumbai. Infact, I have given the job of writing the review to my senior student Dr. Subhendu Chandra. Most probably , he has completed the write up and will communicate that to the journal shortly.
My personal regards,
Joydeep

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Dr. Joydeep Chowdhury Ph.D
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From: "vinod Kumar Rastogi" <v_krastogi@rediffmail.com>
Sent: Tue, 02 Oct 2018 18:19:14
To: <joydeep72_c@rediffmail.com>
Subject: Re: special issue on Raman Spectroscopy/joydeep72_c@rediffmail.com

Asian Journal of Physics
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FF-43, Mangal Bazar, Laxminagar, Delhi, India

Dear Dr Joydeep
I do hope all is fine with you and family. Are you in India or abroad ?I am still waiting for your article for Nov 2018 issue.
Expecting a quick response.
Best regards,
Vinod

On Mon, 30 Jul 2018 21:27:07 +0530 "vinod Kumar Rastogi"<v_krastogi@rediffmail.com> wrote
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>

>
On Mon, 30 Jul 2018 20:45:31 +0530 "joydeep chowdhury" wrote
>
>Respected Sir :
>
> I will try. How much time can I get.
>
>Regards,

ap

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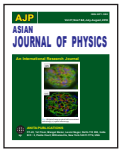

SERS on all dielectric materials: A brief review

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All-dielectric materials are emerging as a new class of substrates for enhanced Raman scattering. As ohmic losses are reduced in the absence of plasmonic metals, Raman data obtained with dielectrics are very reproducible and reliable. This review summarizes the recent works in the field of all-dielectric/semiconductor resonators designed for Raman purposes. Though the enhancement of non-plasmonic effect in surface enhanced Raman scattering (SERS) is still small in comparison to the metal based plasmonic SERS, the former has drawn significant attention in recent years due to reproducibility, reliability and easy availability of all-dielectric/semiconductor based substrates.In this brief review the importance of non-plasmonic SERS has been discussed.

Keywords: non-plasmonic SERS; all-dielectrics; semiconductors

1 Introduction

Surface enhanced Raman scattering (SERS) is a well-established and highly effective technique that has the potential to record Raman scattering from species present at trace concentrations down to single molecule detection level. Recent developments in the synthesis of SERS active materials and its techniques recommend to outstanding progress not only in detection but also in chemical mapping of single molecules [1] and in molecular imaging [2]. Ever since the accidental discovery of SERS by Fleischmann et al in 1974 [3], it has gone distinct stages of development right from single molecule detection to real state-of-art diagnostic applications[4−8]. Various mechanisms are involved to explain the phenomena of non-plasmonic SERS.Trapping of light and creation of optical resonances in dielectric [9-13], morphology-dependent (Mie) resonances in dielectric[14-20],Microlenses: Photonic Nanojets[21-31], 2Dand 3D Assembly of Dielectric Spheres: Arrays and Photonic Crystals[32-40]etc. techniques are used to describe the phenomena of non-plasmonic SERSin all-dielectric materials.Comparisons of SERS on metals and on all-dielectrics have enabled the scientists to elucidate the chemical stability and reproducibility of organic and inorganic molecules over the years[41, 42].However, the up thrust in this field of research is focussed in three directions: (a) Mechanism behind SERS (b) Looking for new SERS active substrates and (c) Applications in chemical and biological sensing.

2 Mechanism behind SERS

Despite intensive theoretical works [43−48], special issues of scientific journals themed to this phenomenon [49−51] and publications of excellent reviews [52−59], the exact nature of the colossal enhancement in Raman intensity found in SERS is still a matter of controversy. However, it is generally accepted that two enhancement mechanisms, one a long-range electromagnetic (EM) effect and the other a short-range chemical (CHEM) effect, are operative simultaneously. April 5

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Fw: National Seminar 2019

joydeep chowdhury <joydeep72_c@rediffmail.com> Wed, Jan 9, 2019 at 12:22 PM
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From: kousik dutta <duttakousik2003@yahoo.co.in>
Sent: Wed, 09 Jan 2019 11:57:56
To: "joydeep72_c@rediffmail.com" <joydeep72_c@rediffmail.com>
Subject: National Seminar 2019

Respected Sir,

We would like to inform you that department of Physics and department of Electronics, Behala College is going to jointly organize a national seminar entitled “Emerging Frontiers in Materials Science 2019" **(EFMS 2019)** on **February 15-16, 2019**. The seminar will include invited talks by eminent scientists, oral and poster presentation by participants. We would be greatly honored if you can spare some of your precious time and grace the seminar by participating in it.

We would also earnestly request you to encourage faculty members of science departments to actively participate in this national seminar. The seminar is also open for participation only without any presentation. Thus we would like to invite interested students to take part in this seminar which will enrich them with emerging knowledge of the field of nano-science and technology.

Kindly see the attachment for the details of the seminar. The extended date of full paper submission for oral and poster contribution is open till **January 25, 2019.**

For the updated full program of **EFMS 2019**, please visit the official seminar website:: https://www.behalacollege.in/seminar/

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PP-02

Study of Surface-enhanced Raman scattering (SERS) and Zeta potential of 5-Methylthio-1, 3, 4-Thiadiazole-2-thiol molecule Adsorbed on Gold Nano Particles

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Surface-enhanced Raman scattering (SERS) is a well-established and highly effective technique for observing Raman scattering from species present at trace concentrations down to single molecule detection limit [1-4]. It is an established technique to understand the surface physics and chemistry between the adsorbate molecule and the nanostructured metal surface [5-7]. The Normal Raman (NR) in solid as well as in the solvent of ethyl alcohol has been performed. The comparative study of Fourier transform infrared (FTIR) and NRS in solid and in solution and their complementary behavior has been absolutely established. Surface Enhanced Raman Scattering (SERS) spectra of various concentrations in the state of protonated and de-protonated condition adsorbed on nano colloidal gold surface of biologically and pharmaceutically significant 5-Methylthio-1, 3, 4-Thiadiazole-2-Thiol (5-MTT) molecule has been investigated. The 5-MTT molecule can exist in various tautomeric forms. Considering the relative stabilities of the various tautomeric forms of the molecule as reported elsewhere [8-9], the two stable thiol (MTTL) [Fig. 1a] and the thione (MTTN) [Fig. 1b] forms of the molecule are considered. The optimized molecular structures of the MTTN and the MTTL forms of the molecule are shown in Figure 1a & 1b. The Self Consistent Field (SCF) energies, as estimated

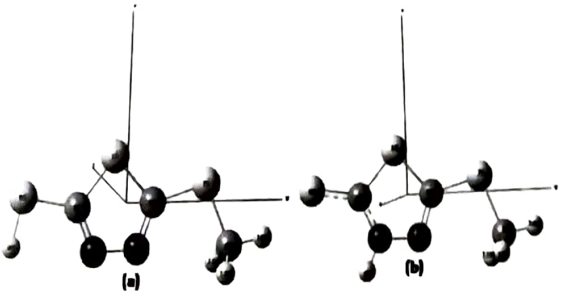

Fig. 1

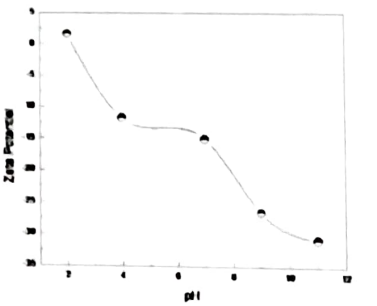

Figure 2

from the Density Functional Theory (DFT) calculations, indicate that the MTTN form is the most stable one, while the MTTL is $\sim$ 47.8 KJ/ mol less stable than the corresponding MTTN form of the molecule. The best experimental SERS spectrum has been observed at the concentration of 10^{-6} M. Significant changes in intensities of different SER bands may be due to the change in the orientation and / adsorbtive site of the probe molecule on nano colloidal surface with concentration. The detail analysis of various contributions of vibrational assignment has been done significantly by DFT calculations using Potential Energy Distribution (PED) and Normal Coordinate Analysis (NCA) technique. We also investigate the electric potential at the boundary of the double layer (zeta potential) of the nanocolloidal silver surface with the concentration as well as various pHs. Zeta potential is negative throughout the concentration and minimum at the concentration 10^{-6} M when the best SER spectra is found. Figure 2 represents the variation of zeta potential with pH of the molecule in the concentration of 10^{-6} M of the molecule where the best spectra have been observed. The detail analysis of the variation of zeta potential with concentration and Fermi-level are also in progress.

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