



Subhendu Chandra &lt;subhendu170975@gmail.com&gt;

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**Fw: IJTP Vol.68 Nos 1 & 2, 2020**

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**susil sarkar** <susil\_vcsarkar@yahoo.co.in>  
To: Subhendu Chandra <subhendu170975@gmail.com>

Mon, Nov 15, 2021 at 8:19 PM

See the Vol 68 Nos 1 & 2, 2020.  
SKS

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## **Review on the Electromagnetic Mechanism behind the Phenomena of Surface Enhanced Raman Scattering (SERS)**

**Subhendu Chandra**

Assistant Professor in Physics, Victoria Institution (College), 78B A. P. C. Road, Kolkata-700 009, West Bengal, India

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**Abstract :** Objective of the review article is to assist the understanding and identification of the electromagnetic mechanism involved in the SERS phenomenon. Electromagnetic (EM) contribution to surface enhancement is though well recognized but charge transfer (CT) contribution to SERS is less clearly understood as yet. It is usually believed that two enhancement mechanisms, one a long-range electromagnetic (EM) effect and the other a short-range chemical (CHEM) effect, are simultaneously operative. The EM mechanism is established on the amplified electromagnetic field produced by optical excitation of surface plasmon resonance of nano-scale surface roughness. When the molecules are adsorbed by the nanocolloidal SERS active metal surface they create hot spots. At the position of the hot spots there will be a huge enhancement of the electromagnetic fields causing amplification of the Raman signal and this enormous application is used in the recent development of science and technology in the fields of physics and chemistry. The various types of EM mechanisms and its recent development are discussed here with detailed theoretical explanations.

**Keywords:** Surface plasmon, Polarizability, Electromagnetic mechanism, Raman bands, Hot spots.



Subhendu Chandra &lt;subhendu170975@gmail.com&gt;

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**Fw: Resolution of EC meeting.**

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**susil sarkar** <susil\_vcsarkar@yahoo.co.in>  
To: Subhendu Chandra <subhendu170975@gmail.com>

Thu, Jul 21, 2022 at 8:07 PM

Pl. see the resolution of EC meeting. SKS

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Pl. see the resolution of EC meeting.. Susil K Sarkar

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**From:** susil sarkar <susil\_vcsarkar@yahoo.co.in>  
**To:** Mrinal Chakrabarti <mkchakra@gmail.com>  
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Subhendu Chandra <subhendu170975@gmail.com>

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**I am sharing 'Metallic Nanoparticles (After correction)' with the highlighted corrected portion.**

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**susil sarkar** <susil\_vcsarkar@yahoo.co.in>

Thu, Jun 1, 2023 at 7:31 PM

Reply-To: susil sarkar <susil\_vcsarkar@yahoo.co.in>

To: Subhendu Chandra <subhendu170975@gmail.com>

Thank you. Your article will be published in IJTP vol.70 Nos 3&4,2022.  
S K Sarkar CITP

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|

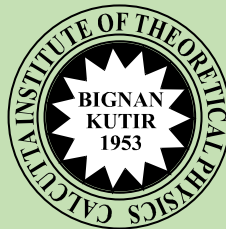
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## **A Brief Review on Metallic Nanoparticles**

**Subhendu Chandra**

Associate professor in Physics

Victoria Institution (College)

78-B, A. P. C. Road, Kolkata-700 009

**[Abstract:** Metallic nanoparticles have involved scientist for over a century and are now deeply applied in biomedical sciences and engineering. They are an attention of interest because of their enormous potential in nanotechnology. Today these materials can be synthesized and improved with various chemical functional groups which allow them to be conjugated with antibodies, ligands, and drugs of interest and thus introducing a extensive variety of potential applications in biotechnology, magnetic separation, targeted drug delivery, and automobiles for gene and drug delivery and more significantly diagnostic imaging. Moreover, different imaging modalities have been established over the period of time such as Magnetic resonance imaging (MRI), computed tomography (CT), Positron Emission Tomography (PET), ultrasound, Surface Enhanced Raman Spectroscopy (SERS), and optical imaging as an aid to image various disease states. This led to the invention of various nanoparticulated contrast agent such as magnetic nanoparticles ( $\text{Fe}_3\text{O}_4$ ), gold, and silver nanoparticles for their application in these imaging modalities. In addition, to use various imaging techniques in tandem newer multifunctional nanoshells and nanocages have been developed. Thus in this review article, we aim to provide an introduction to magnetic nanoparticles