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Surface-enhanced Raman spectroscopy for medical diagnostics and bio-imaging

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Abstract

Surface Enhanced Raman Spectroscopy (SERS) is one of the most valuable analytical to0l which has the ability for ultra-sensitive biochemical sensing and providing its chemical fingerprint. In this lecture we will discuss our recent reports on how SERS can be used for model diagnostics as well as for bio-imaging. Our reported data demonstrated that bio-conjugated nanomaterial base SERS can be used for the ultra-sensitive detection of cancer & different multiple drug resistance bacteria. We have also shown that SERS base optical ruler can be used to monitor drug delivery, photothermal therapy response etc. Here we will discuss first the basic science behind surface enhanced spectroscopy and then it's working principle for medical diagnostics. Next we will discuss SERS applications in biology, medicine, and enviromental science. Finally, we will conclude by speculating about future scientific research and challenges in technological applications of SERS.

Biography

Dr. Paresh C Ray, Professor of Chemistry at Jackson State University. The development of new scientific concepts and technologies in emerging field, which can substantially improve the ability to carry out the mission of USA's Health, Energy and environmental is the career goal of Dr. Ray. His vision is to continue research at the interface of chemistry and biology that include exploring new chemical strategies for the imaging and therapy of cancer cell, multi drug resistance bacteria, creating new nanobased sensor for different chemical and biological toxin, designing multifunctional nanomaterial for multimodal imaging, and enhancing our understanding of biomolecular interaction with nanosurface. He has been author/co-author for over 130 peer-reviewed publications with h index 40. His research has been funded by National Science Foundation, National Institute of Health, Army Research Office, Army Research Lab, Universal Technology Corporation. He is serving as associated editor for three international nanoscience journals and editor for one book series, "Colloids: Classification, Properties and Applications". He has organized symposium at ACS National Meeting at 2008 and 2013. He has organized several workshops on material science in National Science Foundation (NSF).