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Topic of the Research : Synthesis and Characterization of Graphene Oxide based Composites and their Sensing Applications.

In this thesis, we have coined three different techniques for the fabrication of Surface Enhanced Raman Spectroscopy (SERS) based substrates like the Chemical route, Laser ablation, and Electrospinning method. The major goal of the present thesis was aimed to develop various metal nanoparticle/nanostructures, decorated with Graphene Oxide (GO) based hybrid nanocomposites and their investigation through various experimental tools for SERS active substrates. The outcome of the research problems is summarized in well-organized seven chapters in the thesis.

In the first chapter, the motivation of our research problem and the properties of GO and reduced graphene oxide (rGO) have been discussed. Also, we have discussed the importance of the SERS technique.

Second chapter, discussed the Synthesis and fabrication techniques used for SERS active substrate fabrication and characterization.

Third chapter deals with the synthesis and fabrication of SERS active metal nanoparticles and nanostructures by employing chemical route, femtosecond laser ablation, and electrospinning.

Chapters-fourth, fifth and sixth talked about the Chemically synthesized GO/AgNPs, Laser ablated ultra-sensitive hierarchal metal/graphene oxide hybrid and flexible PAN nanofiber mats by electrospinning method, as SERS substrate for explosives and bio-chemical detection.

Finally in the last chapter-7, the conclusion and the future scope of the research work have been discussed.