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## Multiplexing detection of anticancer drugs by Surface-enhanced Raman spectroscopy

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Surface-enhanced Raman spectroscopy (SERS) is gaining popularity in recent times as a label-free detection method for clinical monitoring in the biomedical field, due to its high sensitivity and multiplexing ability. Plasmonic nanostructures made up of Ag, Au, Cu etc. have the ability to confine incident electromagnetic radiation and produce a strong near field in their neighborhood, which can enhance the inherently weak Raman signals of analyte molecules adsorbed to the metallic surface, leading to the phenomenon of SERS. In this work, bimetallic Ag-Cu alloy microflowers (MFs) with tunable surface compositions were fabricated on a glass cover slip by simple thermolysis of metal alkyl ammonium halide precursor and used as SERS substrates for the sensitive detection of anticancer drug Mitoxantrone (MTO). Two different laser excitation sources, 532 nm and 632.8 nm, were used to explore the possibility of better detection capability of the sensor. 10% Ag-Cu MF sensor recorded a notable 'limit of detection (LOD)' value of 1 fM for MTO with red laser, being the lowest till date, by using any analytical technique. Further, using the same substrate, efficient multiplexing SERS based detection of MTO was demonstrated with another anticancer drug Doxorubicin (DOX), in water and mice blood plasma. The study should accelerate the screening of important drugs in the blood and plasma of cancer patients in a simpler, faster, and less-expensive manner.

### Biography

Amit Nag is an Associate Professor in Chemistry, at BITS-Pilani Hyderabad Campus. He received his Ph.D. in 2009 from IIT Kanpur, India under the supervision of Professor Debabrata Goswami on femtosecond laser chemistry. He worked as a Post-doctoral fellow at the University of California, Irvine, U.S.A with Professor Ara Apkarian on scan-probe microscopy and at the Department Chemie und CeNS, LMU, Munich, Germany with Professor Achim Hartschuh on plasmonics and Tip-Enhanced Raman Spectroscopy. He has successfully completed sponsored projects funded by BITS-Pilani, DST and CSIR. His research interests include various applications of Nonlinear laser spectroscopy, Scanning-probe microscopy, Plasmonics, Carbon Dots, Biophysical chemistry.