

9<sup>th</sup> World Congress on

# Chemistry and Medicinal Chemistry

May 13-14, 2019 | Prague, Czech Republic

## Hierarchical SERS substrate of Au Film over Nanosphere (AuFON) fabricated by Ion-Beam Sputtering Deposition

Hong Wang<sup>1</sup>, Zongwei Xu<sup>2</sup>, Ying Song<sup>2</sup>, Liyang Wang<sup>2</sup> and Zhen Yin<sup>1</sup><sup>1</sup> Tianjin Polytechnic University, China<sup>2</sup> Tianjin University, China

In this paper, basing on the method of ion-beam sputtering deposition and the self-assembly of polystyrene (PS) colloidal spheres, the preparation and characterization of Au film over nanosphere (AuFON) hierarchical Surface Enhance Raman Scattering (SERS) substrate were studied. Firstly, the influence of Au film thickness on the hierarchical SERS substrate of polystyrene nanospheres with diameters of 200nm was characterized. Experiments show that when the Au film thickness is 50nm, the density of nano-gaps between the PS colloidal spheres and the SERS substrates enhancement both reach the optimal level. The micro-morphological differences of AuFON SERS substrates prepared by electron beam deposition and ion-beam sputtering deposition were compared and analyzed from the perspective of coating atoms' energy and the polymer modification by ion bombardment. Furthermore, under the condition of optimal coating thickness, the absorption

spectrum indicates that the frequency of LSPR ( $\lambda_{\text{max}}=650$ , 656nm) is closest to the frequency of the excitation light in SERS spectra measured ( $\lambda_{\text{ex}}=633\text{nm}$ ). The FDTD simulation showed that the electromagnetic field intensity of the SERS substrate reached the maximum when the gaps between the coated spheres were about 5nm and the diameter of the Au clusters covering the PS sphere surface was about 20-30nm. Finally, the SERS substrates were used to detect the trace elements of melamine and Sudan III successfully.

### Speaker Biography

Hong Wang, Dr. Engineering, Associate Professor, State Key Laboratory of Hollow Fiber Membrane Materials and Processes, School of Materials Science and Engineering, Tianjin Polytechnic University, China. Her main research interests include, Raman Spectroscopy, Surface Enhance Raman Scattering techniques, wastewater treatment by an electrocatalytic membrane reactor, etc.

e: waho7808@163.com

 Notes: