SILVER NANOPARTICLE-DECORATED ZINC OXIDE TETRAPODS: A PROMISING SUBSTRATE FOR BIOMOLECULE DETECTION USING SURFACE-ENHANCED RAMAN SPECTROSCOPY

Edgars Vanags[1], Ivita Bite[1], Liga Ignatane[1], Reinis Ignatans[1], Annamarija Trausa[1], Ciro-Federiko Tipaldi[1], Karlis Vilks[1], Krisjanis Smits[1]

[1] Institute of Solid State Physics, University of Latvia, 8 Kengaraga st., LV1063 Riga, Latvia.

e-mail of presenting author: edgars.vanags@cfi.lu.lv

In this study, we present the fabrication and analysis of zinc oxide tetrapod substrates decorated with silver nanoparticles for surface-enhanced Raman scattering (SERS) applications, with rhodamine B serving as a control compound for the potential detection of biomolecules.

The silver nanoparticle-doped zinc oxide tetrapods were produced using a solar physical vapor deposition (SPVD) technique, followed by their application onto silicon wafers through a droplet evaporation method. The SERS performance of the silver-doped zinc oxide tetrapod substrate was assessed by detecting rhodamine B via Raman spectroscopy. Our findings show that the substrate exhibits SERS activity and is capable of detecting rhodamine B at concentrations as low as 3 μg/mL. These results suggest that silver nanoparticle-doped zinc oxide tetrapod substrates hold promise as SERS platforms and may be further developed for detecting biomolecules.