

# Our new paper in journal of Applied physics

Congratulations to our new paper "Two-Dimensional Plasmonic Biosensing Platform: Cellular Activity Detection under Laser Stimulation" by Sajede Saeidifard, Foozieh Sohrabi, Mohammad Hossein Ghazimoradi, Seyedeh Mehri Hamidi, Shirin Farivar, Mohammad Ali Ansari

Combining biosensors and nanoscience as a growing technique provides great advantages such as a label-free and real time analysis, high sensitivity, low limit of detection, small size and integration to other systems. That is why plasmonics finds various applications in drug detection, food safety, agriculture, photothermal therapy, etc. In this paper, we have fabricated a two-dimensional plasmonic grating biosensor using soft lithography technique, which has eliminated some disadvantages of conventional plasmonic structures like expensive fabrication cost, inflexibility and lack of mass production. On the other hand, we benefited from infrared neural stimulation for regulating membrane depolarization, which is based on photothermal mechanism and provides a contact-free and high spatial/temporal resolution. Eventually, membrane depolarization of two different cell-types of HepG2 (Hep G2) and Mesenchymal stem cell cultured on two-dimensional plasmonic has been investigated under infrared neural stimulation. After preparing the soft plasmonic crystal, its reflection spectra and respective ellipsometry parameters were analyzed before and after cell culture with/without stimulation (near-infrared immune region ~1450 nm). By comparing the obtained ellipsometry results for HEP G2 and mesenchymal stem cells, it is observed that the behavior of two cell types with respect to IR stimulation is the same

besides providing us the possibility of distinguishing the level of membrane depolarization under various stimulating frequency.

The strength point of this integrated system for membrane depolarization detection has been shown experimentally which can open new avenues toward neuroplasmonic application in the future.