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Gap mode 3D nanostructure supporting strong coupling regime for improving optoelectronic device performance

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SPPs-based optoelectronic device performance is restricted mainly because of high energy loss and weak nonlinearity of plasmon. The performance of these devices can be improved by making them work under a strong-coupling regime where coupling strength dominates energy loss. One way of achieving strong coupling is to couple a nonlinear material (QE's) with metal nanostructure. However, fabrication of such strong coupled nanostructure on a large scale is challenging. In this work, gold pyramids array on gold film nanostructure is fabricated using Nanosphere lithography (NSL) and realized cavity mode both experimentally and from FDTD simulation results. The optimized 3D nanostructure is further demonstrated for strong coupling by incorporating quantum emitters (QEs) in the spacer layer.

Biography

Sujan Kasani is currently a PhD student of Electrical Engineering department in West Virginia University, USA. His research area cover nanofabrication, semiconductor electronics, biosensors and solar energy. He published (first and co authored) 8 papers in high impact factor journals which include Nano Research, JPCC, Analytical chemistry and nano scale horizons. He is also serving as a reviewer for Elsevier - Photonics and Nanostructures, IOP - Nanotechnology and ISME.

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