Michael Giersig, J Laser Opt Photonics 2016, 3:2 (Suppl)
http://dx.doi.org/10.4172/2469-410X.C1.005

Electromagnetic waves interaction with various metallic nanomaterials

Michael Giersig
Helmholtz-Zentrum Berlin, Germany

In this lecture, we will discuss our recent study about the plasmoelectric effect where optical energy can be converted into electrical potential differences in the absence of semiconductors. The active interactions have been visualized by illumination of various in size and morphologies of periodic perforated metallic films by monochromatic light. The nanostructure films have been created by nanosphere lithography (NSL) in conjunction with plasma etching and physical vapor deposition methods. The metallic nanostructures can effectively confine the radiation to nanoscale in the proximity of plasmon resonance whereby the position of this resonance is controlled by the morphology (size and shape) of the nanostructures. The surface potential measurement resulting in enhancement of local fields was analyzed by using Kelvin probe force microscopy (KPFM) under simultaneous illumination in the energy range of the plasmon resonance peak of our nanomaterials towards observing plasmoelectric effects. The recent observation of an enhanced photon induced voltage on Au grating and the second harmonic generation suggests that the overall shape of the structures plays a significant role in determining nonlinear response.

Biography

Michael Giersig has published over 258 internationally refereed publications covering physics, chemistry, materials science, biochemistry, medicine, nanotechnology and engineering. His work has been cited 18051 times quoted in the ISI Index (without self-citations) at an average of over 714 citations per publication, while his H-index is currently 71. He is listed in position 75 in chemistry and 83 in material science in the World Ranking by Thomson Reuters of the 100 Top Chemists and Material Scientists of the past decade 2000-2010.

giersig@helmholtz-berlin.de

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