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Lipid multilayer gratings for multiplexed, label-free biosensing

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Lipid multilayer gratings are a new type of optical transducer based on fluid diffraction gratings on a surface. Tiny oil droplets regularly spaced at the wavelength of visible light function as diffraction gratings. When the liquid droplets interact with an analyte, droplet shape changes due to the interfacial forces involved, resulting in a detectable change in the intensity of light diffracted from the gratings. Using functional phospholipids as the oil enables specific detection of proteins in solution. The crucial property of the grating that allows detection is the lipid multilayer thickness, which must be controlled between ~10-100 nm. Methods for fabricating the gratings include dip-pen nanolithography and a new printing method that we call nanointaglio. The ability to integrate multiple different materials into sensor arrays opens the possibility for multiplexed sensing, and progress towards that goal will be presented.

Biography

Steven Lenhart completed his doctoral studies in 2004 at University of Muenster, and carried out postdoctoral research at the Karlsruhe Institute of Technology and Northwestern University. Since 2010 he has been an assistant professor in the department of Biological Science at the Florida State University. He has published more than 30 papers in reputed journals and serves on the editorial board of Materials Today and Nanofabrication.

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