Imprint Lithography for the Detection of Biomolecules by Localized Surface Plasmon Resonance

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Metal nanopatterns have gained the considerable interest not only because of the physics involved but also because of the potential applications, such as bionanalitical chemistry, bioseparation, bioimaging, magnetism, ultra-high density recording media, etc. In particular, metal nanoparticle-induced localized surface plasmon resonance (LSPR) such as Au can be applied in biological, optical and photonic devices. The LSPR utilizes a collective oscillation of the conduction band electrons that arises in the metal nanopattern when excited by a specific wavelength of electromagnetic radiation. Generally, the position of maximum extinction and the peak shape are related by the shape, size and composition of the nanopatterns or nano particle as well as the interparticle distance and the external dielectric environment. This extinction spectra of the nanopattern exhibit easily measurable wavelength shifts that correspond to small changes in the refractive index within the electromagnetic fields surrounding the nanopattern. In this study, we made a gold nanopattern using imprint lithography and capillary force lithography. And for characterization, we analyze LSPR in the range of near and mid IR according to the size and shape of metal dots and adsorption of biomolecules.