

Exotic plasmonic crystals

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Abstract

We will overview optical properties of plasmonic crystals, periodically nanostructured metal films, with complex crystal lattices. We will discuss their advantages and applications for spectral and polarization multiplexing/demultiplexing, extraction of light from LEDs and biosensing. Active functionalities and tuneability of their photonic properties using electronic, magnetic and optical controls will also be discussed.

Surface plasmon polaritonic crystals-periodically nanostructured metal films-have great potential for engineering dispersion of electromagnetic surface waves to achieve comprehensive control over and design a photonic response with required spectral and polarization properties required in numerous applications ranging from design of fishnet metamaterials to light extraction beyond the total internal reflection from LEDs to applications in miniturised telecom components for passive and active signal manipulation. In the past, mainly square lattice and hexagonal lattice plasmonic crystals were studied. Recently however, more complex periodic nanostructures on a plasmonic crystal platform have been shown to provide unprecedented functionalities and advantages for conditioning of light signals.

In this talk, we will overview optical properties of plasmonic crystals with complex crystal lattices. We will discuss their applications for spectral and polarization multiplexing/demultiplexing, extraction of light from LEDs and biosensing. Active functionalities and tuneability of their photonic properties using electronic, magnetic and optical controls will also be discussed.

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