

MULTIPLEXED REFRACTIVE INDEX STUDIES USING LARGE-AREA NANOSLIT ARRAYS

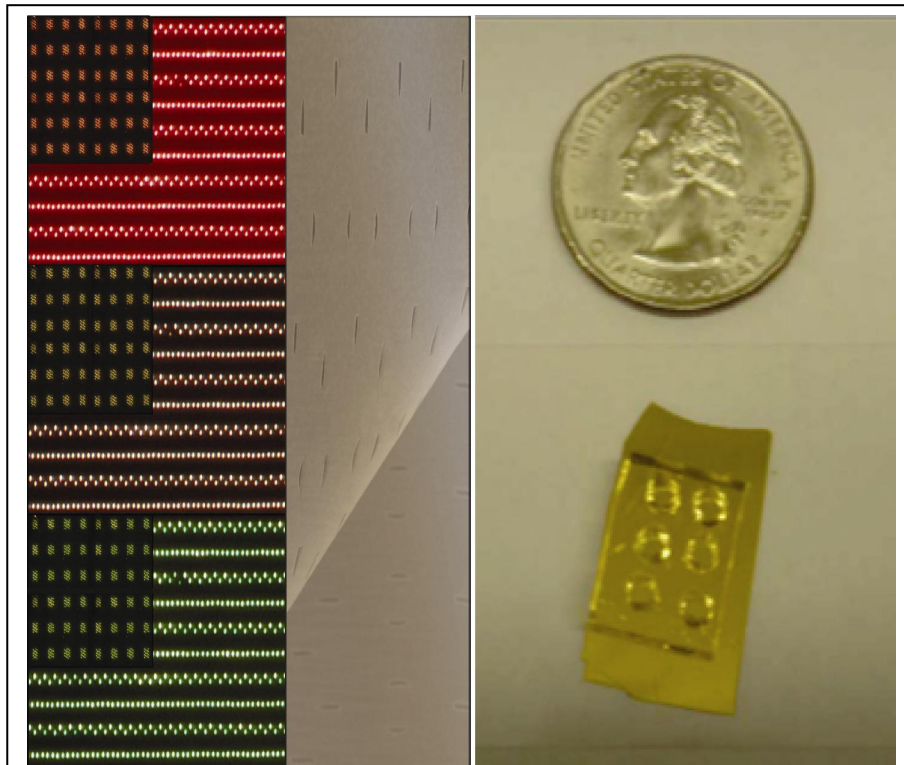
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NU-NSEC researchers fabricated large-area metallic films perforated with arrays of nanoscale slits using a technique that they developed called PEEL. The process combines phase-shifting photolithography, etching, electron-beam deposition, and lift-off of the film. The microscale arrays of patterned nanoslits exhibited: (1) polarization-dependent, color-tunable transmission from green to red, and (2) transmission spectra with extremely narrow features (FWHM < 10 nm). Current investigations focus on the refractive index sensitivity of these plasmonic substrates and testing their multiplexed sensing capabilities. By making use of refractive index investigations with these plasmonic systems, measurements can be made in transmission (instead of extinction) and the polarization-dependent color can be used to enhance specific molecular resonances.



(Left) Free-standing gold films perforated with nanoslits. The red color results when the polarization is perpendicular to the long axis of the hole, while the green color occurs when the polarization is parallel to the long axis. **(Right)** Gold film with nanoslits on glass. This macroscale plasmonic substrate can detect six different materials simultaneously.