

Abstract Submitted
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Extraordinary Optical Transmission through Circular Nanotrenches in Ag Films FENG WANG, Liquid Crystal Institute, Kent State Univ., MIN XIAO, Department of Physics, University of Arkansas, QIHUO WEI, Liquid Crystal Institute, Kent State Univ., LIQUID CRYSTAL INSTITUTE, KENT STATE UNIV. TEAM, DEPARTMENT OF PHYSICS, UNIVERSITY OF ARKANSAS COLLABORATION — This work reports studies on the extraordinary transmission of normally incident light through sub-wavelength circular nanotrenches in Ag films. The concentric periodic nanotrenches are perforated through 100nm thick Ag films by using focused-ion beam (FIB). Far-field transmission measurements show that under the illumination of linearly polarized white light, the transmitted light is not linearly polarized and exhibits broad-band enhanced transmission with the center wavelength varying with the periodicity of the trenches. These spectroscopic experimental results can be reproduced qualitatively through finite-difference time domain (FDTD) simulations. Especially, simulations show that the transmitted light is radially polarized at low frequencies, while azimuthally polarized at high frequencies. These interesting polarization statuses can be explained as a result of competition between transmission of s and p polarized light through periodic gratings of nanotrenches.

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