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Periodically bent porous metal oxide nanostructures as linear polarization selective Bragg filters NICHOLAS WAKEFIELD, University of Alberta, Edmonton, Canada, KYRYLO TABUNSHCHYK, National Institute of Nanotechnology, Edmonton, Canada, MICHAEL BRETT, ANDRIY KOVALENKO, JEREMY SIT — The periodically bent nematic liquid crystal (LC) phase is a theoretical arrangement characterized by uniaxial rod shaped mesogens in an s-shaped configuration. The periodically bent phase is predicted to yield strong linear polarization selective Bragg effects due to the modulation of the extraordinary refractive index throughout the sample. Unlike the analogous selective circular Bragg effects obtained from the readily achievable chiral nematic LC phase, the periodically bent nematic phase is comparatively more difficult to realize. Glancing angle deposition is a physical vapour deposition technique which allows for the fabrication of isolated columnar nanostructures, suitable for LC infiltration. Using advanced substrate motion control, s-shaped films and other designs that incorporate a modulated extraordinary index are easily fabricated. Experimental transmittance and reflectance spectra are presented to examine the strength and polarization selectivity of the stopband for as-deposited metal oxide films. The dependencies on film material and deposition angle are investigated. The observed results are compared to simulations obtained using a frequency domain electromagnetic mode solver and to earlier results obtained for the periodically bent nematic LC phase.

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