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Extraordinarily Large Diffraction Efficiencies by Permanent Gratings in Carbon Nanotube and Methyl Red Doped Liquid Crystal GENE CARLISLE, SAUNAB GHOSH, YOUSEF SULEIMAN, West Texas A&M University — We present a detailed description on the preparation of nematic liquid crystal (E7) cells doped with only methyl red as well as doped with single-wall carbon nanotubes and methyl red. Permanent grating were written by use of either 532-nm or 488-nm pump beams and probed with a 670-nm beam. The cells doped with carbon nanotubes and methyl red produced extremely high diffraction efficiencies of 60 percent. Cells doped only with methyl red generated diffraction efficiencies around 10 percent. The angular dependence of polarized absorption spectra and diffraction are in agreement with a photochromic mechanism for the phase modulation. The permanent gratings are quite stable when stored at ambient conditions for over one year.

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