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Fabrication of Broad Band Mid-Infrared Absorber based on Periodic Dielectric-Thin Metal Film Multilayer Structures SHY-HAUH GUO[1], Department of Materials Science and Engineering, University of Maryland, College Park, MD 20742, ANDREI B. SUSHKOV, Department of Physics, University of Maryland, College Park, MD 20742, TIMOTHY CORRIGAN, Department of Physical Sciences, Concord University, Athens, WV 24712, DONG PARK[2], Department of Electrical Computer Engineering, University of Maryland, College Park, MD 20742, H. DENNIS DREW[3], Department of Physics, University of Maryland, College Park, MD 20742, PAUL KOLB, WARREN HERMAN, Laboratory for Physical Sciences, College Park, MD 20740, RAYMOND PHANEUF[4], Department of Materials Science and Engineering, University of Maryland, College Park, MD 20742 — We present results from measurements on periodic multilayer structure of alternating dielectric and thin metal layers to achieve a broadband absorber of mid-infrared radiation. We examine the effect on performance of a back-reflective metallic bottom layer, surface roughness at interfaces, the metal conductance, the thickness of dielectric layers, and a patterned anti-reflective layer. We determine optimum structure parameters for absorption of a 500 K-black body spectrum, and find that the numerical results agree well with the measured absorption spectra. We also investigate the possibility of fabricating a patterned anti-reflective layer to further increase the absorption.

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