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Terahertz composite right/left-handed transmission-line metamaterial surfaces[1] ZHIJUN LIU, PHILIP HON, AMIR TAVALLAEE, TATSUO ITOH, BENJAMIN WILLIAMS, Electrical Engineering Department, University of California, Los Angeles, California 90095, USA, UCLA TERAHERTZ DEVICES AND INTER-SUBBAND NANOSTRUCTURS LABORATORY TEAM, UCLA MICROWAVE ELECTRONICS LAB TEAM — We present terahertz metamaterial waveguides based on the concept of composite right/left-handed (CRLH) transmission-lines implemented in a metal-dielectric-metal geometry. The waveguides are fabricated with spin-coated Benzocyclobutene sandwiched between a ground plane and photolithographically defined top capacitive metal pads. Angle-resolved reflection spectroscopy measurement is used to map the dispersion of this metamaterial surface, which reveals strong resonant absorptions for both right-handed and left-handed (backward wave) propagating modes within the leaky-wave bandwidth. Tuning of the waveguide dispersion is demonstrated by varying the integrated lumped element capacitive geometry. The incident polarization provides selection of different waveguide modes, exhibiting either fully right/left handed, or right-handed only propagation. Analysis based on full-wave finite element method simulations as well as lumped circuit models will be presented.

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