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Title:Photoinduced handedness switching in terahertz chiral metamolecules
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Abstract:Switching the handedness, or the chirality, of a molecule is of great importance in chemistry and biology, as molecules of different handedness exhibit dramatically different physiological properties and pharmacological effects. Here we experimentally demonstrate handedness switching in metamaterials, a new class of custom-designed composites with deep subwavelength building blocks, in response to external optical stimuli. The metamolecule monolayer flips the ellipticity and rotates the polarization angle of light in excess of 10 degrees under optical excitation, a much stronger electromagnetic effect than that of naturally available molecules. Furthermore, the experimentally demonstrated optical switching effect does not require a structural reconfiguration, which is typically involved in molecular chirality switching and is inherently slow. The handedness switching in chiral metamolecules allows electromagnetic control of the polarization of light and will find important applications in manipulation of terahertz waves, such as dynamically tunable terahertz circular polarizers and polarization modulators for terahertz radiations.
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