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Abstract:By using intense terahertz(THz) monocycle pulses, nonlinear light-matter interaction in aligned semiconducting single-walled carbon nanotubes(SWNTs) embedded in a polymer film was investigated. THz electric-field-induced ultrafast Stark effect of onedimensional excitons in SWNTs was observed at room temperature, suggesting the potential functionality of SWNTs for high speed electro-optic devices operating at telecom wavelength with a THz bandwidth. When the peak electric field amplitude exceeds 200 kV/cm, the generation of excitons by the THz pump becomes prominent. The mechanism is described by the above-gap excitation of electrons and holes in SWNTs due to the impact excitation process induced by the intense THz electric field. © Springer Science+Business Media, LLC 2012.
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