

283. Title:Terahertz-frequency photoconductive detectors fabricated from metal-organic chemical vapor deposition-grown Fe-doped InGaAs

Authors:Hatem, O. (1); Cunningham, J. (1); Linfield, E.H. (1); Wood, C.D. (1); Davies, A.G. (1); Cannard, P.J. (2); Robertson, M.J. (2); Moodie, D.G. (2)

Source title:Applied Physics Letters

Volume:98

Issue:12

Issue date:March 21, 2011

Publication year:2011

Language:English

Document type:Journal article (JA)

Abstract:We report the detection of terahertz frequency radiation using photoconductive antennas fabricated from Fe-doped InGaAs, grown by metal-organic chemical vapor deposition. Coherent photoconductive detection is demonstrated using femtosecond laser pulses centered at either an 800 or a 1550 nm wavelength. The InGaAs resistivity and the sensitivity of photoconductive detection are both found to depend on the Fe-doping level. We investigate a wide range of probe laser powers, finding a peak in detected signal for ~ 5 mW probe power, followed by a reduction at larger powers, attributed to screening of the detected THz field by photo-generated carriers in the material. The measured signal from Fe:InGaAs photoconductive detectors excited at 800 nm is four times greater than that from a low-temperature-grown GaAs photodetector with identical antenna design, despite the use of a ten times smaller probe power. \copyright 2011 American Institute of Physics.