

PHOTOCONDUCTIVE RESPONSE OF ERBIUM DOPED MBE EPITAXIALLY GROWN GERMANIUM

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The Institute for Research in Optical Communications of San Luis Potosí University (IICO-UASLP), has as one of its main research lines the growth and physical characterization of semiconductor materials. The aim is to grow homogeneous III-V and IV alloys and simple compounds, as well as heterostructures of these materials. The medium term objective is to grow infrared emitting semiconductor lasers, that could be relevant at the wavelengths of interest for optical communications. as an illustration of the kind of materials and research projects we are interested in, we present a study of an erbium doped p-Ge epitaxial layer, MBE grown on a n-Ge undoped substrate. The spectra indicate that the Er-doped Ge layer shows a continuum photoconductivity response in the far infrared region extending from 70 to 900 cm^{-1} , i.e., between 10 to 140 μm , making this type of epitaxial Er-doped Ge layers potentially attractive systems to be used for photoconductive detectors for radiation in this spectral range. Below 900 cm^{-1} three acceptor charged states can be distinguished with ionization energies 9, 26.6 and ≥ 50 meV. Additionally, a study of the photoconductive response of the same sample for radiation above 1000 to 10,000 cm^{-1} , for i.e. radiation energies well inside the forbidden gap to energies above it, shows a wealth of levels some of them previously identified to be associated with the erbium.

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