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Isoelectronic Traps in Gallium Phosphide THERESA CHRISTIAN, University of Colorado, Boulder and National Renewable Energy Laboratory, KIRSTIN ALBERI, DANIEL BEATON, BRIAN FLUEGEL, ANGELO MASCARENHAS, National Renewable Energy Laboratory — Isoelectronic substitutional dopants can result in strongly localized exciton traps within a host bandstructure such as gallium arsenide (GaAs) or gallium phosphide (GaP). These traps have received great attention for their role in the anomalous bandgap bowing of nitrogen or bismuth-doped GaAs, creating the dramatic bandgap tunability of these unusual dilute alloys. In the wider, indirect-bandgap host material GaP, these same isoelectronic dopants create bound states within the gap that can have very high radiative efficiency and a wealth of discrete spectral transitions illuminating the symmetry of the localized excitonic trap state. We will present a comparative study of nitrogen and bismuth isoelectronic traps in GaP. Research was supported by the U. S. Department of Energy, Basic Energy Sciences, Materials Sciences and Engineering Division under contract DE-AC36-08GO28308 and by the Department of Energy Office of Science Graduate Fellowship Program (DOE SCGF), made possible in part by the American Recovery and Reinvestment Act of 2009, administered by ORISE-ORAU under contract no. DE-AC05-06OR23100.

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