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Hyperdoping Si with transition metals for infrared detection¹ JAY MATHEWS, YINING LIU, University of Dayton, WENJIE YANG, Australia National University, QUENTIN HUDSPETH, U.S. Army ARDEC-Bent Labs, GIRISH MALLADI, HARRY EFSTATHIADIS, SUNY Polytechnic Institute, JAMES WILLIAMS, Australia National University, JEFFREY WARREN-DER, Watervliet Arsenal — Recent advances in the field of laser hyperdoping have produced a new class of materials that could lead the way to silicon-based, CMOScompatible infrared detectors. Using the method of ion implantation followed by pulsed laser melting (II-PLM), silicon films with impurities at concentrations well above the solid solubility limit can be fabricated. Recent work has centered on using transition metals like Au or Ti as the impurity, as their deep level impurity states broaden into intermediate bands, thereby creating sub-band gap optical absorption. In this work, we report on efforts to develop the fabrication methods for realization of photodetectors from Si:Au and Si:Ti, including etching the materials and forming Ohmic contacts. We also explore the optical and electrical properties of fabricated Si:Au and Si:Ti photodetectors.

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