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Giant magnetoresistance in InMnAs/InAs heterojunctions and its composition and temperature dependence[1] JOHN PETERS[2], CHRISTOPHER GARCIA, BRUCE WESSELS[3], Materials Research Center, Northwestern University, Evanston IL — The transport properties of magnetic semiconductors play a central role in spintronics as they provide an effective insight into spin related phenomena. Motivated by predictions of large magnetoresistance effects in dilute magnetic semiconductor heterojunctions, the electronic and magnetotransport properties of narrow gap heterojunction diodes have been demonstrated. We report here on the positive magnetoresistance of $p-In_{1-x}Mn_xAs/n-InAs$ magnetic semiconductor heterojunctions and its dependence on Mn concentration and temperature. The junction magneto-conductance is well described by an analytical expression for the total conductance G_{tot} of two spin-split bands. From the junction magneto-conductance an effective g-factor due to a giant Zeeman effect was determined for varying Mn concentration. The effective g-factor increased with increasing Mn concentration from 98 to 131 for x_{Mn} =0.01 to x_{Mn} =0.06. /newline /newline Use of the Center for Nanoscale Materials at Argonne National Laboratory was supported by the U. S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357.

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