

Abstract Submitted  
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**Interface Effects on Spin Injection in Fe/AlGaAs spin-LEDs** T. ZEGA, R. STROUD, A. HANBICKI, G. KIOSEOGLU, O. VAN'T ERVE, C. LI, B. JONKER, Naval Research Laboratory, M. YASAR, R. MALLORY, A. PETROU, State University of New York at Buffalo — We have measured spin-injection efficiency (SIE) at room temperature for Fe/AlGaAs spin light-emitting diodes ranging from 1 to 32%. Here we report results from transmission electron microscope (TEM) studies of the interface between Fe and AlGaAs. Measurements of the interface thickness show an inverse correlation with SIE, i.e., samples with thicker interfaces have lower SIEs. The correlation predicts that as the interface thickness decreases to zero the SIE approaches 37%, comparable to the 40% spin polarization commonly accepted for bulk Fe. The results imply that greater SIE can only be achieved by specifically altering the interface structure to achieve spin filtering. In the other limit, complete suppression of the injected spin polarization occurs if the interface thickness exceeds 2 nm. The possibility of determining atomic-scale interface structure by comparing simulated- to experimental-TEM images will be discussed.

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