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Electron accumulation on bare and hydrogenated indium nitride surfaces BRIAN THOMS, RUDRA BHATTA, ANANTA ACHARYA, MUSTAFA ALEVLI, NIKOLAUS DIETZ, Georgia State University, DEPARTMENT OF PHYSICS & ASTRONOMY TEAM — Electron accumulation layers which affect device and contact properties have been reported on several semiconductor surfaces such as InAs, InN, and CdO. Adsorbates have been shown to affect the electron density on InAs surfaces, however, surface termination effects for InN have not been determined. In this work surface-sensitive electron spectroscopic techniques are used to study both the electron accumulation layer and the surface structure on N-polar InN. High resolution electron energy loss spectroscopy (HREELS) has been used to characterize the surface electron accumulation by observing changes in the energy of the conduction band plasmon loss with variations in incident electron energy. In addition, HREELS along with low energy electron diffraction and Auger electron spectroscopy allow characterization of the surface structure and bonding. By this method it is shown that both hydrogen-terminated and bare N-polar InN surfaces exhibit electron accumulation. These results indicate that surface electron accumulation on InN is not due to indium-indium bonding and is not substantially affected by the presence or absence of surface hydrogen, but may instead be intrinsic to the N-polar InN surface. The effects of other adsorbates will also be discussed.

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