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X-Ray Photoemission Analysis of Chemically Treated CdZnTe Semiconductor Surfaces ART NELSON, LLNL, DANIEL VAZQUEZ, UC Santa Barbara, ANN BLISS, CHERYL EVANS, JIM FERREIRA, REBECCA NIKOLOC, STEVE PAYNE, LLNL — Device-grade $Cd_{(1-x)}Zn_xTe$ was subjected to various chemical treatments commonly used in device fabrication to determine the resulting microscopic surface composition/morphology and the effect on contact formation. Br-MeOH (2% Br), N_2H_4, NH_4F/H_2O_2, and $(NH_4)_2S$ solutions were used to modify the surface chemistry of the $Cd_{(1-x)}Zn_xTe$ crystals. Scanning electron microscopy was used to evaluate the resultant surface morphology. Angle-resolved high-resolution photoemission measurements on the valence band electronic structure and Zn 2p, Cd 3d, Te 3d, O 1s core lines were used to evaluate the chemistry of the chemically treated surfaces. Metal overlayers were then deposited on these chemically treated surfaces and the I-V characteristics were measured. The measurements were correlated to understand the effect of interface chemistry on the electronic structure at these interfaces with the goal of optimizing the metal/$Cd_{(1-x)}Zn_xTe$ Schottky barrier for radiation detector devices. This work was performed under the auspices of the U.S. Dept. of Energy by the University of California Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

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