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Interface band alignment in high-k gate stacks[1] BERSCH ERIC, Rutgers University, P. HARTLIEB, S. SAYAN, R. BARTYNSKI, E. GARFUNKEL, Rutgers University — In order to successfully implement alternate high-K dielectric materials into MOS structures, the interface properties of MOS gate stacks must be better understood. Dipoles that may form at the metal/dielectric and dielectric/semiconductor interfaces make the band offsets difficult to predict. We have measured the conduction and valence band densities of states for a variety MOS stacks using *in situ* using inverse photoemission (IPE) and photoemission spectroscopy (PES), respectively. Results obtained from clean and metallized (with Ru or Al) HfO_2/Si, SiO_2/Si and mixed silicate films will be presented. IPE indicates a shift of the conduction band minimum (CBM) to higher energy (*i.e.* away from E_F) with increasing SiO_2. The effect of metallization on the location of band edges depends upon the metal species. The addition of N to the dielectrics shifts the CBM in a way that is thickness dependent. Possible mechanisms for these observed effects will be discussed.

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