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Growth and characterization of high k ZrO_2 on Ge (100) ABDUL RUMAIZ, GABRIELLA CARINI, PETER SIDDONS, NSLS, Brookhaven National Laboratory, JOSEPH WOICIK, NIST, PAVEL REHAK, Brookhaven National Laboratory — The higher mobility of carriers combined with a low effective mass in Ge as compared to Si has generated a lot of interest in Ge based devices. This is particularly so in X-ray radiation detectors where Si based detectors become transparent at higher energy. The challenge in realizing a Ge based detector is having a robust barrier oxide since the native Ge oxide is hygroscopic. We have grown high k ZrO_2 on Ge (100) using direct metal sputtering followed by UV oxidation [1]. High energy X-ray photoelectron spectroscopy (XPS) was performed to study the oxidation state of ZrO2 as well the interface with Ge. A simple structure with Ge/GeO/ZrO_2(25 nm)/Al (200 nm) was created. A significant hysteresis was observed in the capacitance-voltage measurement which is indicative of some interface states [2]. The effect of the intermediate layer between ZrO_2 and Ge on the interface states will be addressed. Valence band measurement done using high energy XPS will be discussed. [1] C. O. Chui, S. Ramanathan, B. B. Triplett, P. C. McIntrye and K. C. Sarawat, IEEE Electron Dev. Lett. 28, 473 (2002) [2] H. Kim, C.O. Chui, K. C. Sarawat and P. C. McIntrye, Apl. Phys. Lett. 83, 2647 (2003)

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