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XPS Study of Nitrided Hf-based high-k dielectrics F.S. AGUIRRE-TOSTADO, A. HERRERA-GOMEZ, CINVESTAV Queretaro, Mexico and University of Texas at Dallas, M.J. KIM, B.E. GNADE, R.M. WALLACE, University of Texas at Dallas, M.A. QUEVEDO-LOPEZ[1], P.D. KIRSCH[2], SEMATECH — Nitridation of SiO_2 has been demonstrated to increase the dielectric constant of the resulting SiON dielectric allowing further scaling of conventional CMOS devices. Nitridation of Hf-based high-k dielectrics such as HfSiO and HfO_2 also results in increased dielectric constant. Besides increased k, nitrogen incorporation in Hf-based dielectrics increases films thermal stability. In this work we systematically study the incorporation of nitrogen in HfSiO and HfO_2 using plasma assisted nitridation and thermal treatments The nitrogen concentration and chemical interactions are studied using x-ray photoelectron spectroscopy and x-ray diffraction. The role of nitrogen on the electrical properties is also discussed.

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