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The effect of Gd doping on the atomic and electronic structure of HfO_2 thin films. IHOR KETSMAN, ANDREI SOKOLOV, KIRILL BELASHCHENKO, PETER DOWBEN, University Nebraska-Lincoln, YAROSLAV LOSOVYJ, Louisiana State University, JINKE TANG, ZHENJUN WANG, University of Wyoming — HfO_2 is a promising oxide for many applications, including high-k gate dielectric for CMOS devices. In addition, Gd-doped HfO_2 could lead to a dilute magnetic semiconductor and provide an efficient neutron detection medium due to huge neutron absorption cross section of Gd. Gd-doped HfO_2films deposited on both $p-$type and n-type silicon by PLD retain monoclinic phase at small doping levels, but can be stabilized in fluorite phase by increased doping [1]. At small doping levels, photoemission measurements indicate n-type character of the films as a result of overcompensation with oxygen vacancies. Depending on a doping level, the films form heterojunctions with good rectifying properties on n- or p-type silicon. Preliminary results show the potential ability of the formed diode structures to detect neutrons. [1] Ya.B.Losovyj, I.Ketsman et al.,APL, 91, 132908, (2007)

Ihor Ketsman
University Nebraska-Lincoln

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