Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Pd/Ru surface alloys – Creating a "noble" surface from reactive elements XIANGSHI YIN, MUSTAFA M. ÖZER, HANNO H. WEITERING, The University of Tennessee, Knoxville, TN & Oak Ridge National Laboratory, Oak Ridge, TN, PAUL C. SNIJDERS, Oak Ridge National Laboratory, Oak Ridge, TN — We have studied the growth and reactivity of ruthenium thin films on palladium (111) substrates. To obtain smooth and well-ordered film surfaces, the films were annealed to 600 °C. The surface structure, morphology, and chemical composition were investigated with LEED, STM, and AES. The experiments showed that annealed Ru film surfaces contain large concentrations of Pd. The reactivity of this alloy surface towards oxygen was then studied in oxygen gas adsorption experiments at room temperature, and compared to the oxidative properties of bulk Ru and bulk Pd. The surface alloy of the film turns out to be quite inert to oxygen adsorption at room temperature. STM experiments of oxygen adsorption at 112 K reveal that oxygen does adsorb at low temperature but it readily desorbs above 200 K. This surprise finding of a "noble" Pd/Ru surface alloy provides an interesting contrast to the surfaces of bulk ruthenium and palladium, which oxidize easily at room temperature. Research supported by the U.S. Department of Energy, Basic Energy Sciences, Materials Sciences and Engineering Division

Xiangshi Yin
The University of Tennessee, Knoxville, TN &
Oak Ridge National Laboratory, Oak Ridge, TN

Date submitted: 11 Dec 2012 Electronic form version 1.4