

Abstract Submitted
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Contrasting growth modes of Ru thin film nano-structures on Si and Pd¹ XIANGSHI YIN, AO TENG, The University of Tennessee, MUSTAFA ÖZER, Oak Ridge National Laboratory, HANNO WEITERING, The University of Tennessee, PAUL SNIJDERS, Oak Ridge National Laboratory — We have studied Ruthenium thin film growth on both Si (111) and Pd (111) surfaces. The films were deposited at low (LN2) temperature and at room temperature, and subsequently annealed at elevated temperatures, up to 600C. The surface structure, morphology, and chemical composition were investigated by LEED, STM, AES and XPS. Upon deposition at low temperature, nanoclusters are formed on both Si and Pd. Remarkably, the nanoclusters are approximately 3 nm in diameter and exhibit narrow size distributions on both substrates. In the case of Ru on Si, XPS spectra indicate silicide formation at the interface above 300C, but the nanocluster surface morphology survives up to 600C. On the other hand, nanoclusters on Pd smoothen into atomically flat films above 200C. The striking difference in adatom mobilities on these substrates is surprising in light of the very high melting temperature of Ru (2400C).

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