Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Real-Time UV-FEL PEEM of Silicide Nanostructure Coarsening Dynamics on Si(100) MATTHEW ZEMAN, North Carolina State University, WOOCHUL YANG, Dongguk University, ROBERT NEMANICH, North Carolina State University — The coarsening dynamics of nanoscale silicide ($TiSi_2$, $ZrSi_2$, $HfSi_2$) islands on Si(100) are observed in ultra high vacuum using tunable ultraviolet free electron laser (UV-FEL) excitation for photo electron emission microscopy (PEEM). The UV-FEL PEEM is employed for real-time, in situ observation of the nanostructure dynamics and evolution during continuous annealing at high temperatures (1200°C). In situ movies will be presented which detail the coarsening processes where the silicide nanostructures grow via Ostwald ripening and attractive migration and coalescence (AMC). AMC is a coarsening process where nearby islands are observed to migrate attractively towards each other and subsequently coalesce. This process has been attributed to the growth-decay flow of the island edges driven by a non-uniform chemical potential around the islands. This non-uniform chemical potential is predicted to result in an island shape distortion due to the local flux of adatoms from/onto the inner- facing edges of the coalescing islands. This non-uniform chemical potential is observed as an increase in the island radius along the migration direction as well as a decrease in the radius of curvature of the inner facing (growing) edges of the coalescing islands.

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Date submitted: 30 Nov 2005 Electronic form version 1.4