

Abstract Submitted  
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**Surface Self-Assembly Driven by Dislocation Annihilation and Glide**<sup>1</sup> BOGDAN DIACONESCU, KARSTEN POHL, University of New Hampshire — The process of growing nanometer sized ordered arrays of clusters on the misfit dislocation networks of strained metallic thin films [1, 2] requires a detailed understanding of the nucleation and film-adsorbate interaction at the atomic level. In the case of sulfur adsorption on submonolayer silver films on 0001 surface of ruthenium, the Ag's short herring bone rectangular misfit dislocation unit cell of 19(18)x16(15) Ag atoms reconstructs into a well-ordered triangular array of S filled Ag vacancy islands 18 Ag atoms apart. Atomically and time resolved variable temperature STM measurements correlated with 2D Frenkel-Kontorova models based on first principles interaction parameters show how a sequential process of Ag vacancy island formation, followed by annihilation of adjacent and opposite pairs of threading dislocation and glide of Shockley partial dislocations generates the uniform triangular array of Ag vacancy islands. We conclude that the strain in the Ag film is the driving force responsible for the surface self-assembly process. 1. Pohl *et al.*, Nature 397, 238 (1999) 2. K. Thürmer *et al.*, Science 311, 1272 (2006)

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Bogdan Diaconescu  
University of New Hampshire

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