

Abstract Submitted  
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**Nano-Ionic in Molecular Nanojunctions**<sup>1</sup> LAM YU, MATTHEW ROBERSON, University of Memphis — Metal filament growth can be induced on the surfaces of electrochemically active metals such as silver and copper by an external electric potential. We study the voltage-driven formation and dissolution of nanoscale silver filaments in silver/molecular-layer/gold junctions. In this system, an applied electric voltage causes oxidation at the silver surface and the resulting silver cations from the reaction are transported away from the silver surface toward the gold surface. The silver cations are reduced at the gold surface and from the accumulation of the transported silver particles, filaments are formed from the gold surface. We found that the energy required for silver nanofilament formation depends critically on the thickness and electrostatic property of the molecular layer, while the energy required for the dissolution of silver nanofilaments is virtually molecule-independent. I will discuss what our results tell us about chemical reactions in the nanoscale, and the practical application of our results in the area of electronic memory and chemical sensors.

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