

Abstract Submitted
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Conduction across Silicon Nanoparticle-Metal Interfaces

MATTHEW STUPCA, University of Illinois Physics, MUNIR NAYFEH, ADAM SMITH — We deposited a thin film of 1nm diameter silicon nanoparticles between two metallic films. The nanoparticles are created by an electrochemical process and are collected into solution. The particles are then deposited by evaporating the solution through electrospray or spin coating processes. The nanoparticle films of closely packed particles are observed to strongly absorb UV photons and fluoresce in the blue – a characteristic of individual nanoparticles. We examine the photoconductivity of the films under UV illumination using IV spectroscopy. Our measurements indicate that the photoconductivity exhibits asymmetry and rectification in current flow for two metals which have different work functions. These results suggest that these films of nanoparticles, while retaining their nanoparticle characteristic luminescence, show the Shottky barrier associated with bulk behavior.

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