Fabrication of Nano-Patterned Substrate—
Investigation of Electronic and Mechanical Properties of Fullerene Embedded Si(111) Surfaces

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Abstract

In summary, this study examines the feasibility of fabricating a single layer C_{84} embedded Si surface in a UHV system through a controlled self-assembly mechanism. The nano-characteristics of the sample surface are examined using various surface analysis approaches in both the atmosphere and UHV system. Experimental results indicate that the C_{84} embedded Si surface has a highly uniform distribution, a high emission efficiency and a low turn-on voltage, making it highly promising as a field emitter source. Theoretical calculations also appear to correlate well with experimental results. The fullerene embedded silicon surface, based on a controlled nanotechnology self-assembly mechanism, is a significant improvement in the application field of FED, optoelectronical device fabrication, and semiconductor carbide replacement.

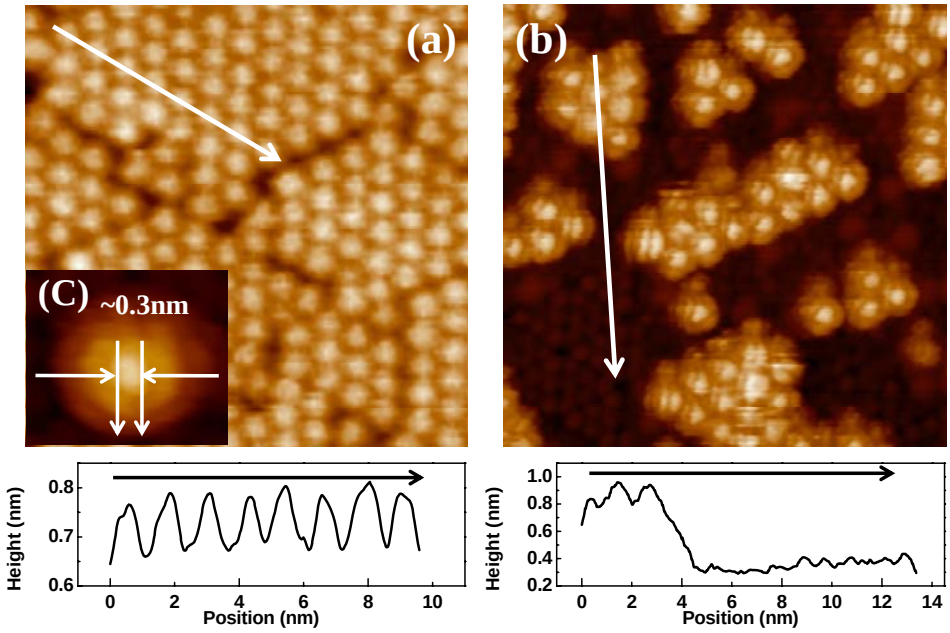

Figure 1: STM images with profiles analysis of (a) single C_{84} embedded Si(111) surface, (b) Si(111) super-lattice surface, and (c) close up view of a C_{84} molecule on a self-assembled surface.

Reference

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