

THE NUCLEATION AND GROWTH OF SILICON NANOFILMS IN SUPERCOOLED LIQUID/SOLID PHASE

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ABSTRACT

The formation of silicon nanofilms can be described using an approach of nucleation and island growth mechanism with enhanced supercooling. The theoretically derived parameters (ΔG , ΔG^* , r^* , ΔG_v , ΔT) were found to be in the acceptable ranges that, Si nanofilms resembling 8 nm quantum dots could be fabricated on the substrate at extremely low nucleation rates. A Volmer-Weber growth model was used to explain the growth mode, initially by the aggregation of nuclei which increase in size leading to a liquid/solid phase transition. The resulting Si nanofilms were expected to be in an un wetting oval-shaped due to stronger nuclei-nuclei interactions.

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