

Abstract Submitted  
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**Nucleation and Growth of a Nanobubble on Rough Surfaces**

SHANTANU MAHESHWARI, Shell Technology Centre Bangalore, COR VAN KRUIJSDIJK, Shell Technology Centre Amsterdam, SUCHISMITA SANYAL, Shell Technology Centre Bangalore, ALBERT HARVEY, Shell Technology Centre Houston — We study the nucleation and growth of a nanobubble on rough surfaces by using molecular dynamics simulations. A nanobubble nucleates and grows by the virtue of a heterogenous surface reaction which results in the production of gas molecules near the surface. We study the role of surface roughness in the nucleation and growth behaviour of a nanobubble. We perform simulations at various reaction rates and surface morphology, and quantified the growth dynamics of a nanobubble. Our simulations show that after the onset of nucleation, nanobubble grows rapidly with radius following  $t^{1/3}$  behaviour followed by diffusive growth regime which is marked by  $t^{1/2}$  growth behaviour. This growth behaviour remains independent of surface roughness and reaction rates over the range considered in this study. We also quantified the oversaturation of gas required for the nucleation of a nanobubble and demonstrated its dependence on the surface morphology.

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