Quantitative Experimental Studies of Homogeneous and Heterogenous Nucleation in Evaporating Films

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Classical nucleation theory distinguishes between heterogeneous and homogeneous nucleation that occur depending on the conditions. We present for the first time experiments were we can deliberately switch in a precisely controlled way between heterogeneous and homogeneous nucleation [1]. Using spin-coating as an easy adjustable and reproducible technique, we carefully investigated the evaporation process and modeled the developing concentration profiles. Figure [1] shows the obtained concentration profiles for two diffusion constants and an AFM image of the obtained aggregates. It is obvious that two species of aggregates are present, steaming from different nucleation positions in the film. This offers new technical applications and renders new quantitative insights into the dynamics of nucleation and growth. Thus we can show, for instance quantitatively, how surface topologies on the nanometer scale affect heterogeneous nucleation processes.

\begin{figure}[h]
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\includegraphics[width=0.5\textwidth]{figure1.png}
\caption{Concentration profiles in film during spin coating and AFM image showing bimodal distribution of C60 aggregates.}
\end{figure}

References

1 to be submitted