

Mullins-Sekerka Instability and Phase Transitions in the Dioctadecylamine Monolayer

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Different regions of the pressure vs. temperature diagram of the dioctadecylamine Langmuir monolayer have been studied using pressure-area isotherms and Brewster angle microscopy. We describe the observed domains and textures of the different regions, as well as their boundaries, for this monolayer between 5 °C and 35 °C, at pH=3. All our observations indicate that dioctadecylamine does not form a monolayer above pH~3.9. We found in this diagram clearly defined areas, which can be considered as phases. We also found a transition region that presents star-shaped domains, which grow as the lateral pressure increases. Several experiments were done to understand the origin of these star-shaped domains. Our conclusion is that this pattern-forming process is driven by a Mullins-Sekerka instability.