Abstract Submitted
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Orientational Order of Molecular Assemblies on Inorganic Crystals[1] JAEHUN CHUN, Department of Chemical Engineering, Princeton University, DUDLEY SAVILLE, Department of Chemical Engineering, Princeton University, JE-LUEN LI, Department of Chemistry, Princeton University, HANNES SCHNIEPP, Department of Chemical Engineering, Princeton University, ROBERTO CAR, Department of Chemistry, Princeton University, ILHAN AKSAY, Department of Chemical Engineering, Princeton University — Surfactant micelles form oriented arrays on crystalline substrates such as HOPG (Highly Ordered Pyrolytic Graphite) although registration is unexpected since the template unit cell is small compared to the size of a rod-like micelle. In addition, with atomic force microscopy, we show that orientational ordering is a dynamic, multi-molecule process. Interaction energy calculations based on molecular simulations reveal that orientational energy differences on a molecular scale are too small to explain matters. However, treating the cooperative processes as a balance between van der Waals torque on a large, rod-like micellar assembly and Brownian motion shows that orientation is favored. Our study provides a physical insight on regulation of self-assembly structures at small length scale.

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