



INTERFACIAL EFFECTS: EPITAXY AND BIOFILMS REVEALED BY AFM

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An interface can change everything. In this talk, I will discuss the effect of an interface on two different environmental processes: the growth of ionic crystals on foreign substrates and the development of bacterial biofilms. Atomic force microscopy (AFM) is the perfect instrument for such investigations as we can examine the systems in situ for a variety of properties. The interaction between substrate and solute ions proves to be an important parameter in determining crystal growth modes. Favorable interactions can cause significant ion enrichment at the surface, which leads to crystal growth in unexpected conditions, i.e., in undersaturated solutions. The environment of the interface can also play a major role in biological systems. Many bacteria spend the majority of their life in a biofilm, a complex community of sessile microorganisms attached to a substrate and held together by organic material. These biofilms are very robust and are thought to be one component behind the emergence of antibiotic resistant superbugs. The physical properties of these biofilms can change dramatically under different environmental conditions and in the presence of different substrates. New AFM techniques allow us to probe the adhesion of bacterial biofilms to clean surfaces in varying solutions. Changing the electrolyte concentration alters the bacteria's ability to adhere to the substrate, which has important ramifications for biofilm removal.