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Mica Surface Properties Investigated by Force Spectroscopy

Thursday, 6 September 2018 15:00 (3 hours)

Mica (muscovite) is a substrate commonly used for TEM and AFM imaging because of its atomic flatness, high cleavage and transparency. This aluminosilicate has sheet structure. Crystallographic structure of mica consists of two layers of Si and Al tetrahedrals and one Al octahedral sublayer between them.^{1,2} Force spectroscopy technique was used to determine physicochemical properties such as adhesion between the AFM probe and the surface, Young's Moduli, deformation depth and the surface stiffness.

In this work adhesion forces were measured in different conditions (air or NaCl solution with ionic strengths range of 0.001 – 0.15 M). The velocities of AFM tip withdrawal were in the range of 0.02 – 5 $\mu\text{m s}^{-1}$. The main goal of these experiments was finding correlation between physiochemical properties and environmental conditions.

References

1. Christenson, H. K. & Thomson, N. H. The nature of the air-cleaved mica surface. *Surf. Sci. Rep.* 71, 367–390 (2016).
2. De Poel, W. et al. Muscovite mica: Flatter than a pancake. *Surf. Sci.* 619, 19–24 (2014).

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