

# Adsorption of Polymer Depressants on Model Hydrophobic Surfaces: QCM-D and AFM Studies

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## Abstract

The adsorption of 3 different polymers (Polymer-H, Dextrin-TY and CM cellulose, all common flotation depressants) on model substrates of varying initial hydrophobicity (mixed self-assembled monolayers), and their ability to reduce contact angle of the substrate, was investigated using the quartz crystal microbalance (QCM-D), atomic force microscopy (AFM), and captive bubble contact angle measurements. The QCM-D data for Polymer-H adsorbing on the different substrates indicates that the polymer adsorbs faster and to a greater extent on surfaces with higher initial hydrophobicity. The ability of the polymer to reduce the contact angle of the substrates was related to the adsorbed amount *and* the morphology of the adsorbed layer. For adsorption onto the model substrate with a contact angle comparable to common gangue minerals (e.g. talc), the three polymers undergo different degrees of conformational change during the adsorption process. We have been able to correlate polymer conformation with adsorbed water content<sup>1</sup>, but have found little correlation between water content and the ability of the polymer to reduce the hydrophobicity of the substrate.

1. Craig, V. S. J.; Plunkett, M., *J. Colloid Interface Sci.* **2003**, 262, 126.