

Electrochemistry: ATR-IR spectroscopy coupling

Attenuated Total Reflection (ATR) is a useful sampling method in IR spectroscopy today. With ATR sampling, IR beam is directed to an IR-transparent crystal with high refractive index, such as Si and Ge. The IR beam is totally internally reflected on the interface between medium of incidence and solution. Total reflection coincides with the generation of an evanescent wave. If the sample is light-absorbing, the evanescent wave can be partially absorbed by molecules near the interface. Compared with sampling in transmission geometry, ATR provides a series of advantages: a) It can be used to analyze thicker samples, in which the IR beam would be totally absorbed in transmission spectroscopy. b) With intimate contact to the ATR crystal, this method can be applied to solid samples c) By producing multiple reflections, it can offer high sensitivity of detection, e.g. of intermediates in an electrochemical or catalytic reaction at the interface.

1,2,3-Benzotriazole is known as an effective corrosion inhibitor by forming a passivating layer on metal. In this experiment, we use silicon as ATR crystal. We will measure the IR absorption spectrum of its aqueous solution while applying different external electrode potentials, and try to detect its structural change from these spectra.

Other experiments with own samples can be performed in agreement with the organizers.

