

## Study the adsorption mechanism of corrosion inhibitor on carbon steel surface

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### Abstract

ToF-SIMS was used to study the adsorption of tetradecyl-benzyl-dimethyl-ammonium (BDA-C14) corrosion inhibitor on carbon steel surface. BDA-C14 forms a protective layer with N-containing polar head group interacting with carbon steel surface. The adsorbed inhibitor surface coverage strongly depends on immersion time and inhibitor concentration. A full and uniform coverage is found for sufficiently long exposure times at a critical inhibitor concentration of about 25 ppmw. For immersion times below 20 min, defective areas remain in the inhibitor layer where iron dissolution with the formation of chloride/hydroxide intermediates occurs. These defective areas are progressively sealed and a uniform and compact inhibitor layer covers the surface after 1 h of immersion time, mitigates the chloride diffusion through oxide layer and the formation of chloride/hydroxide intermediates.

**Keywords** Corrosion inhibitor, Surface analysis, ToF-SIMS

### Reference

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