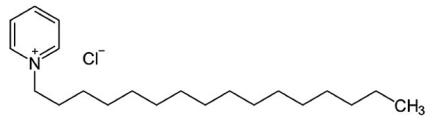
RSA™
REDUCED SURFACE ACTIVITY GLASS

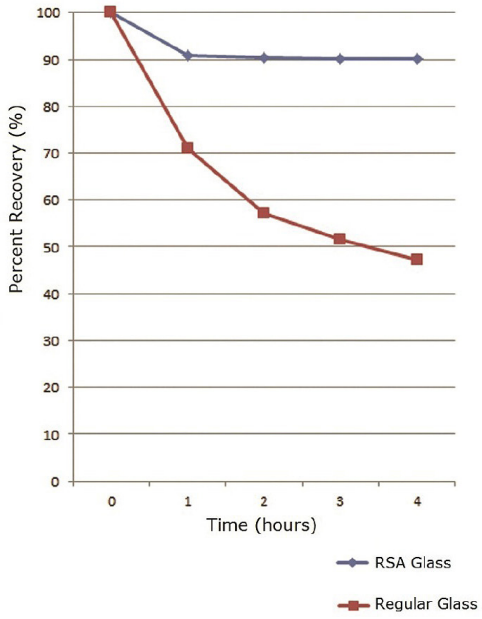
APPLICATION NOTE

Time-Dependent Vial Adsorption Studies

Percent Recovery



Cetylpyridinium chloride



Notes: Time dependence studies are important for several reasons. If multiple injections were made, the analyst would observe different peak areas at different times of injection, leading to poor precision. Identifying the cause may be difficult, as one may attribute it to analyte degradation or another issue.
This takes up valuable lab time, resources and costs for investigation and troubleshooting.

Method Conditions

Item: RSA™, glass vials and AQR caps

Column: Diamond Hydride™, 4µm, 100Å

Catalog No.: 70000-7.5P (column)
9509S-1WCP-RS (Easy Purchase Packs of RSA vials & AQR caps)

Specifications: Reduced Surface Activity glass, clear, 2ml, write on, screw top vials and non-slit AQR caps

Mobile Phase: 50% DI H_2O/ 50% acetonitrile/ 0.1% formic acid

Flow rate: 1.0 mL/min

Sample: 5.0 ppm cetylpyridinium chloride reference standard in DI H_2O diluent. Portions of the same sample were transferred to the two vial types and injected into an HPLC at time intervals of 1 hour for 4 total hours. Peak areas were recorded and compared to initial injections to calculate percent recovery.

Discussion

This study investigated the effect of analyte loss to adsorption with hydroxyl groups on the glass surface of an autosampler vial over time. The surface of standard, industry-leading glass vials are populated with hydroxyl groups. Basic analytes can bind electrostatically or via hydrogen-bonding with these sites, leading to lower sample recovery.

The peak area of cationic test solute cetylpyridinium chloride was found to drastically decrease over time using conventional Type 1 Class A, borosilicate glass autosampler vials. In contrast, the RSA™ glass vial percent recovery leveled off quickly and did not drop below 90%. This is because RSA glass has been manufactured without surface hydroxyl groups which cause the adsorption and quantitative loss.

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