Ion Chromatography of Inorganic Anions in Brine Samples

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Summary

The determination of low level anions in a brine water with ion-chromatography using two different column systems have been studied.

A conventional low ion-exchange capacity anion exchange column was employed in a chloride form and eluted with sodium or potassium chloride eluents. A large chloride matrix ion peak in a brine sample eluted at the void volume of the column.

Bromate, bromide, nitrate and nitrite ions in a brine sample were thoroughly separated from each other, and any distortion in the peak shape of four anions was observed up to ca. 20 mg/ml of the chloride concentration in the sample solutions.

When 50 ul of brine sample was injected on the column and monitored with a UV detector, the detection limit of nitrite spiked in the seawater was 2.4 ng/ml as No_2-N.

Next, a poly(vinylalcohol) gel based reversed phase column, Asahipak ODP-50 column was examined. Carbonate and nitrite were retained and separated each other with 1-10 mN sulfuric acid eluents. Cations and other inorganic anions were evicted from the column. A follow fiber cation exchange membrane tube with a 50 mN sodium sulfate enhancer system worked efficiently to detect carbonate at a conductivity detector. Nitrite peak area was also increased with the enhancer when a UV detector is used.

A micro column connected to an electrochemical detector proved the applicability of the method for the repeated injection of the seawater sample spiked with nitrite at ppb level. The detection limit of nitrite in the system was 2.5 pg as NO_2-N.