
Carbon Dioxide

For water and seawater

Titration Method

Introduction

Carbon dioxide is present in all surface waters, generally in amounts less than 10 mg/L; however, higher concentrations are not uncommon in ground waters. Dissolved carbon dioxide has no harmful physiological effect on humans and is used to recarbonate water during the final stages of water-softening processes and also to carbonate soft drinks. High concentrations of dissolved carbon dioxide are corrosive and have been known to kill fish.

The analysis for carbon dioxide is similar to that for acidity. A water sample is titrated to a phenolphthalein end point with Sodium Hydroxide Standard Solution. Strong mineral acids are assumed to be absent or to be negligible in effect. Care must be taken during the analysis to minimize the loss of carbon dioxide from the water sample as a result of aeration during collection and swirling of the sample.

Chemical reactions

The reaction of sodium hydroxide with carbon dioxide (as carbonic acid) occurs essentially in two steps; first a reaction from carbonic acid to bicarbonate and then to carbonate.

Because the conversion of carbon dioxide to bicarbonate is complete at pH 8.3, phenolphthalein can be used as a color indicator for the titration. The sodium hydroxide titrant must be of high quality and be free from sodium carbonate.

