Nickel

For water **Heptoxime and PAN Methods**

Introduction

Nickel is seldom found in natural waters, but often present in industrial wastewater as a direct product of metal plating baths, and as a corrosion product of stainless steel, nickel or cobalt alloys. Nickel is considered relatively nontoxic to humans. The toxicity of nickel to aquatic life varies widely and is influenced by species, pH, synergetic effects, and other factors. Nickel salts at concentrations between 0.5 and 1.0 mg/L have been shown to be toxic to some plant species.

Two methods for determining nickel, the Heptoxime Method and the PAN Method, are used in Hach procedures. The well-known heptoxime indicator has been formulated into a dry, stable powder packaged in pillows for the nickel determination. A second powder pillow is used to overcome interference from other metals present. The heptoxime forms a yellow complex, which is extracted into chloroform for measurement.

The PAN procedure is a sensitive method for detecting nickel and cobalt in concentrations less than 1 mg/L. The method is unique because simultaneous determinations of nickel and cobalt concentrations can be made on the same sample portion without the need for solvent extraction or sample preconcentration steps.

Chemical reactions

Heptoxime method

Nickel is analyzed quantitatively through its reaction with Heptoxime to form a yellow-colored complex, which is then extracted into a chloroform layer to concentrate the color and to enable a more sensitive colorimetric determination. Chelating agents are added to the sample to overcome the interferences caused by cobalt, copper and iron.

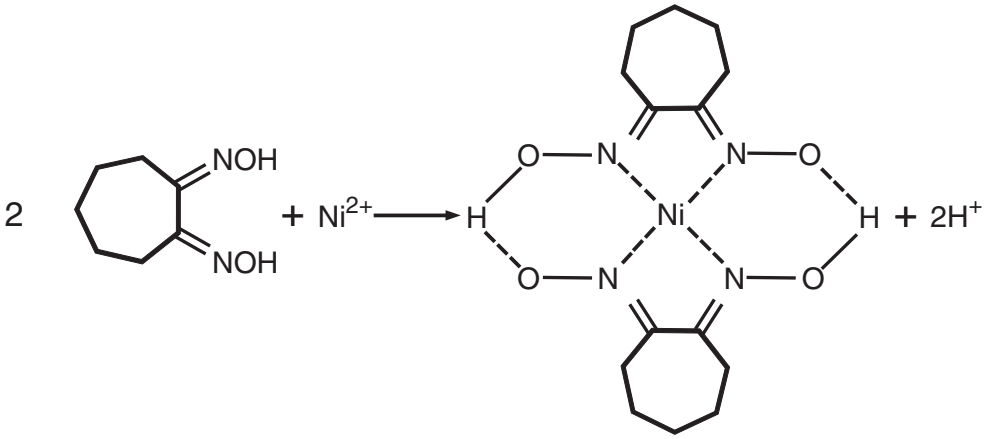

Figure 1 Chemical reactions for Heptoxime method

PAN method

The PAN method for nickel is discussed in detail in the PAN method for cobalt, because both cobalt and nickel can be determined on the same sample.