

⟨206⟩ ALUMINUM

This procedure is provided to demonstrate that the content of aluminum (Al) does not exceed the limit given in the individual monograph of a substance labeled as intended for use in hemodialysis. [NOTE—The *Standard Preparations* and the *Test Preparation* may be modified, if necessary, to obtain solutions of suitable concentrations adaptable to the linear or working range of the instrument.]

NITRIC ACID DILUENT

Transfer 40 mL of nitric acid to a 1000-mL volumetric flask, and dilute with water to volume.

STANDARD PREPARATIONS

Treat some aluminum wire with 6 N hydrochloric acid at 80° for a few minutes. Dissolve about 100 mg of the treated wire, accurately weighed, in a mixture of 10 mL of hydrochloric acid and 2 mL of nitric acid by heating at about 80° for approximately 30 minutes. Continue heating until the volume is reduced to about 4 mL. Cool to room temperature, and add 4 mL of water. Evaporate to about 2 mL by heating. Cool, and transfer this solution, with the aid of water, to a 100-mL volumetric flask, dilute with water to volume, and mix. Transfer 10.0 mL of this solution to a second 100-mL volumetric flask, dilute with water to volume, and mix. Transfer 1.0 mL of this solution to a third 100-mL volumetric flask, dilute with water to volume, and mix. The concentration of aluminum in this *Standard Preparation* is about 1.0 µg per mL. If a more diluted *Standard Preparation* is required, transfer 1.0-, 2.0-, and 4.0-mL portions of this solution to separate 100-mL volumetric flasks, dilute with *Nitric Acid Diluent* to volume, and mix. These solutions contain 0.01, 0.02, and 0.04 µg of Al per mL, respectively.

TEST PREPARATION

Unless otherwise directed in the monograph, transfer an accurately weighed amount (in g) of the test substance, as specified in the monograph, to a 100-mL plastic volumetric flask, add 50 mL of water, and sonicate for 30 minutes. Add 4 mL of nitric acid, dilute with water to volume, and mix.

PROCEDURE

Determine the absorbances of the *Standard Preparations* and the *Test Preparation* at the aluminum emission line at 309.3 nm with a suitable atomic absorption spectrophotometer (see *Atomic Absorption Spectroscopy* (852)) equipped with an aluminum hollow-cathode lamp and a flameless electrically heated furnace, using the *Nitric Acid Diluent* as the blank. Plot the absorbances of the *Standard Preparations* versus the content of Al, in µg per mL, drawing a straight line best fitting the three points. From the graph so obtained, determine the quantity, in µg, of Al in each mL of the *Test Preparation*. Calculate the amount of Al in the specimen taken, in µg per g, by multiplying this value by 100/W, where W is the weight, in g, of the substance taken to prepare the *Test Preparation*.