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Determination of chromium (VI) in electrical and electronic products -- Atomic fluorescence spectrometry

电子电气产品中六价铬的测定

原子荧光光谱法

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Determination of chromium (VI) in electrical and electronic products -- Atomic fluorescence spectrometry

Warning -- The personnel using this document shall have practical experience in formal laboratory work. This document does not indicate all possible safety issues. The user is responsible for taking appropriate safety and health measures and ensuring compliance with the conditions stipulated by relevant national laws and regulations.

1 Scope

This standard specifies the analytical method for the determination of chromium (VI) in electrical and electronic products by atomic fluorescence spectrometry.

This standard applies to the determination of chromium (VI) in polymer materials in electrical and electronic products.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 6682 Water for analytical laboratory use -- Specification and test methods

GB/T 26125 Electrical and electronic products -- Determination of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers) (GB/T 26125-2011, IEC 62321:2008, IDT)

3 Principles

After the hexavalent chromium in the sample is extracted with toluene-lye extraction solution, adjust the pH value to 2~4 with nitric acid, and make it pass through a cation exchange column; then, trivalent chromium is retained on the column, and hexavalent chromium directly flows out. After dilution, the content of chromium in the solution was determined by atomic fluorescence spectrometry to calculate the content of hexavalent chromium in the sample.

add water to dilute to 1000 mL.

5.8 0.01 mol/L HNO_3 solution: measure out 0.9 mL of concentrated nitric acid (5.1), then add water to dilute to 1000 mL.

5.9 Toluene.

6 Sample preparation

The samples shall be manually sheared, roughly ground, and finely ground according to GB/T 26125, crushed to less than 1 mm, for later use.

7 Analysis steps

7.1 Extraction

Weigh 0.1 g of sample (the weight shall be accurate to 0.1 mg) and put it into a sealable extraction tank. Measure out 10 mL of the extract (5.4) and 5 mL toluene (5.9) with a graduated cylinder, add to the sample and place in the sealable extraction tank; seal the extraction tank and put it into a microwave-assisted extraction device, carry out the extraction according to the reference extraction procedure given in Table A.1.

After the extraction is completed, open the tank after cooling, cool and centrifuge it; transfer the lower layer of the aqueous phase solution into a 25 mL volumetric flask, and wash the organic phase twice with water; incorporate the aqueous phase into the volumetric flask, and make up the volume with deionized water, then obtain the extract.

7.2 Separation

Take 4 mL of HNO_3 solution (5.7), activate the cation exchange column twice, and wash with deionized water until neutral.

Take 2.5 mL extract, adjust the pH value to 2~4; load the sample, and wash twice with 1mL HNO_3 solution (5.8); collect the effluent and washing solution, and then make up the volume to 10 mL; test it later.

7.3 Drawing of the standard curve

Stepwise dilute the standard working solution of hexavalent chromium (5.6), carry out separation treatment according to 7.2, and then obtain the standard solution series in Table 1. According to Table A.2 (Working conditions of the atomic fluorescence spectrometer) and Table A.3 (Electrothermal evaporation conditions), draw the working curve.

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