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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

GB 31604.22-2016

**National Food Safety Standard - Food Contact Materials
and Articles - Determination of Dichlorodifluoromethane
in Products of Foamed Polystyrene**

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National Food Safety Standard - Food Contact Materials and Articles - Determination of Dichlorodifluoromethane in Products of Foamed Polystyrene

1 Scope

This Standard specifies the method for determination of dichlorodifluoromethane in products of foamed polystyrene.

This Standard applies to the determination of dichlorodifluoromethane in products of foamed polystyrene.

2 Principles

According to relevant gas law, PLACE the sample in a sealed equilibration flask; and USE a solvent to dissolve. At a certain temperature, dichlorodifluoromethane diffuses. When it reaches an equilibration, TAKE the head space gas and INJECT it into gas chromatograph for determination.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are analytically pure. The water is the Grade II water specified in GB/T 6682.

3.1 Reagents

3.1.1 N, N-dimethylacetamide (C_4H_9NO): chromatographically pure.

3.2 Standard

Dichlorodifluoromethane (CCl_2F_2) (CAS Number: 75-71-8): The purity>99%.

3.3 Preparation of standard solutions

3.3.1 Standard stock solution of dichlorodifluoromethane (100 $\mu\text{g/mL}$): Accurately WEIGH 1 mg (accurate to 0.01 mg) of dimethylacetamide standard in a 10 mL brown volumetric flask; USE N, N-dimethylacetamide to dissolve and dilute to volume; and MIX well. At 4 °C, STORE it for 1 year.

- c) Inlet temperature: 250 °C;
- d) Detector temperature: 300 °C;
- e) Carrier gas: nitrogen; the purity is greater than or equal to 99.999%.
Constant current mode; flow rate: 1.0 mL/min;
- f) Injection volume: 1.0 mL, split injection; the split ratio is 20:1;
- g) Make-up gas: nitrogen, 60 mL/min.

5.3 Making of standard curve

ADD 3 mL of N, N-dimethylacetamide in each of 5 equilibration flasks; CAP the plugs; USE a microsyringe to take 0 µL, 3 µL, 15 µL, 30 µL, 150 µL, 300 µL of standard working solution of dichlorodifluoromethane (1 µg/mL) and INJECT into the flasks through rubber plug; gently SHAKE well and PUT in a constant temperature water bath at 65 °C to equilibrate for 15 min. The standard curve concentrations are 0 ng/mL, 1 ng/mL, 5 ng/mL, 10 ng/mL, 50 ng/mL, 100 ng/mL. Respectively TAKE 1 mL of the head space gas and INJECT into gas chromatograph; TAKE the dichlorodifluoromethane content as the abscissa; TAKE the peak area as the ordinate and DRAW standard curve. The gas chromatogram of dichlorodifluoromethane standard solution is as shown in Figure A.1.

5.4 Determination of sample solution

Manually or automatically INJECT the head space gas, which contains 1 mL of the sample, into gas chromatograph to determine; and OBTAIN the peak area. According to the standard curve, OBTAIN the content of dichlorodifluoromethane in the sample solution. At the same time, CARRY out blank test.

6 Analysis results expression

The content of dichlorodifluoromethane in the sample is calculated according to the equation (1):

$$X = \frac{\rho \times 1\,000}{m \times 1\,000} \times V \quad \dots\dots\dots (1)$$

Where:

X - The content of dichlorodifluoromethane in the sample, in micrograms per kilogram (mg/kg);

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