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NATIONAL STANDARD OF THE
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GB 2432-1981

(Reconfirmed in 1988)

**Gasoline - Determination of Tetraethyl
Lead Content - Complexometric Titration**

汽油中四乙基铅含量测定法（络合滴定法）

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Gasoline - Determination of Tetraethyl Lead Content - Complexometric Titration

This Method is applicable to the determination of tetraethyl lead content in gasoline.

1 Method Summary

This method uses boiling hydrochloric acid to decompose tetraethyl lead in gasoline to produce lead chloride. Then add excessive ethylenediaminetetraacetic acid disodium standard solution, which reacts with lead ions to form a complex. The excessive ethylenediaminetetraacetic acid disodium standard solution was titrated by zinc chloride standard solution. It is expressed by grams of tetraethyl lead in 1kg of gasoline.

2 Instruments

2.1 Burette: 25mL.

2.2 Pipette: 25 and 50mL.

2.3 Conical flask with stopper grinding mouth: 500mL.

2.4 Measuring cylinder: 50 and 100mL.

2.5 Thermometer: 0~100°C, with division of 1°C.

2.6 Petroleum density meter: 0.710~0.770 g/mL.

2.7 Volumetric flask: 1000mL.

2.8 Electric hot plate or sealed electric furnace: 300watts.

2.9 Condenser tube: Five-ball with grinding mouth is matched with conical flask.

3 Reagents

3.1 Hydrochloric acid: analytically pure, formulated into 6N hydrochloric acid aqueous solution.

3.2 Ammonia: analytically pure.

G – weight of zinc particles, in g;

65.38 - grams of zinc per gram of molecule.

4.2 Preparation and calibration of 0.02M ethylenediaminetetraacetic acid disodium standard solution:

4.2.1 Preparation: take 8g of ethylenediaminetetraacetic acid disodium; dissolve it in 1000mL of distilled water; and mix well.

4.2.2 Calibration: accurately take 25mL of ethylenediaminetetraacetic acid disodium standard solution in a conical flask; add 5~6 drops of 0.5% xylenol orange aqueous solution; adjust the solution to a pink color by ammonia water. Then use the 6N hydrochloric acid aqueous solution to adjust it into bright yellow; and then add 0.5 mL of 6N hydrochloric acid aqueous solution; add 1.5~2.0g of hexamethylenetetramine; and immediately titrate by a 0.02M zinc chloride standard solution until the solution turns from yellow to pink, which shall be regarded as the end point.

The molar concentration, M_3 , of the ethylenediaminetetraacetic acid disodium standard solution is calculated according to Formula (3):

$$M_3 = \frac{M_2 \cdot V_1}{25} \dots\dots\dots (3)$$

Where:

M_2 – molar concentration of zinc chloride standard solution;

V_1 – volume of zinc chloride standard solution consumed by titration, in mL;

25 – volume of the measured ethylenediaminetetraacetic acid disodium standard solution, in mL.

Perform each calibration at least for three times; and the difference among the results of each measurement shall not exceed 0.2% of the arithmetic mean; otherwise it must be discarded.

$$\text{(i.e.: } \frac{\text{maximum value} - \text{minimum value}}{\text{average value}} \times 100 < 0.2\%)$$

Take the arithmetic mean value of no less than three titration results as the molar concentration of ethylenediaminetetraacetic acid disodium standard solution.

5 Test Procedures

5.1 In a clean conical flask with a stopper, inject 50mL of specimen by a pipette; add

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