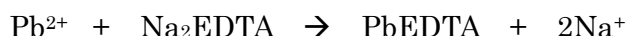


| | | | |
|-------------------------------|------------|---|-------------|
| AQUACOUNTER Application Sheet | COM series | DATA No. G9 | 1st edition |
| Metal | | Quantification of lead ion (Pb²⁺) | |

1. Measurement outline

Chelate titration is most popularly used as the general quantification method for lead ion. The pH range in which lead ion can be titrated directly is pH3.5 – 10 (stability constant = 17.88). However, it forms precipitate of Pb(OH)₂ in alkaline range, and it is necessary that adjuvant complexing agent such as ethanolamine, tartaric acid or citric acid to prepare weak chelate compound and prevent precipitation of hydroxide when it is titrated in alkaline condition. To titrate in acidic range, it is conducted at around pH4 – 5. This section introduces an example of lead ion quantification with XO indicator (red purple → yellow) by adding hexamine aqueous solution to adjust to pH of approximately 5.



2. Reagents and Electrodes

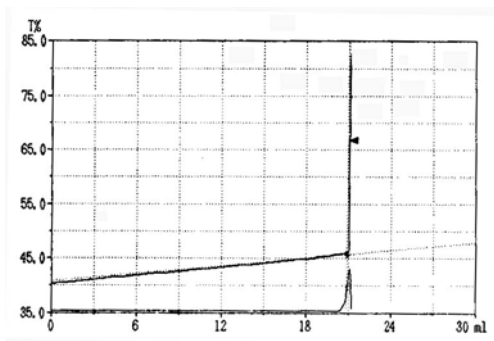
| | | |
|----------------|--------------------------------------|--|
| (1) Reagents | Titrant | 0.01mol/L EDTA titrant |
| | Buffer | 10mL 20% hexamine aqueous solution for 1 measurement |
| | Indicator | 0.1mL XO indicator (0.1% ethanol solution) for 1 measurement (Red purple → yellow) |
| (2) Electrodes | Photometric probe with 530 nm filter | |

3. Measurement conditions example (for COM-1600M w/ Photometric unit)

| | |
|--------------------------|----------------------|
| Master File No.1 | |
| Condition file: 1 | |
| Method | F Cross |
| Amp No. | 2 |
| Buret No. | 1 |
| Meas Unit | T% |
| S-Timer | 0 sec |
| CP | 0 mL |
| DP | 0 mL |
| End Sens | 1000 |
| Over mL | 0 mL |
| Max Vol | 30 mL |
| Mode No. | 20 |
| Unit | g/L |
| Blank | 0 |
| Factor | Titer of the titrant |
| Molarity | 0.01 |
| K | 207.2 |
| Formula | (D-B)×K×F×M/S |

| | |
|-------------------|-------|
| Mode No.20 | |
| Pre Int | 0 sec |
| Del K | 9 |
| Del Sens | 0 mV |
| Int Time | 3 sec |
| Int Sens | 3 mV |
| Brst Speed | 2 |
| Pulse | 20 |

4. Measurement example



Measurement results on lead ion (Pb²⁺)

| Sample No. | Sample volume (g) | Titration value (mL) | Concentration (g/L) |
|------------------|-------------------|----------------------|---------------------|
| 1 | 2.0435 | 20.683 | 21.0553 |
| 2 | 2.0688 | 20.940 | 21.0563 |
| 3 | 2.0671 | 20.901 | 21.0343 |
| 4 | 2.0482 | 20.687 | 21.0111 |
| Avg. | | | 21.0393 g/L |
| Std. Dev. | | | 0.021 g/L |
| C.V. | | | 0.10 % |

5. Outline

About interfering ions

It does not interfere with measurement even when alkaline-earth metals or Mg coexist in the pH range of this method. However, caution is required since Fe³⁺, Ni²⁺, Zn²⁺, Cd²⁺, Co²⁺, etc. will be titrated at the same time.

Key words

Chelate titration, lead ion, XO indicator, hexamine

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