

Base Number Titration of Crude Oil Samples

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Experimental Materials

Electrode: Orion model 81-02 Combination pH electrode with filling solution of saturated NaClO_4 in Isopropanol
Titrant: 5ml 70% HClO_4 , 15ml $(\text{CH}_3\text{CO})_2\text{O}$ dilute to 1000ml with glacial HAc
Spiking sol'n: ~ 0.5g Quinoline dilute to 100ml with Decane
Standard sol'n: ~0.2g KHP dilute to 250ml with HAc

Titration Procedures

- Orion model 520A pH meter calibration with pH 4 and 7 buffers
- Set the Brinkmann Buret/Dispenser 350 at DISC C mode with titration rate 0.4-0.6 ml/min
- Titrant standardization with 50ml KHP standard solution
- 1ml spiking solution in 50ml MIBK solvent titration with standardized titrant
- 1ml crude oil in 50 MIBK solvent, spiked with 1ml spiking solution titration with standardized titrant

Calculations

The molarity concentration of titrant (N) is calculated as such:

$$N = 1000 \times W_{\text{KHP}} / (204.23 \times V_{\text{eq}})$$

in which, W_{KHP} is the amount (g) of KHP in 50ml of KHP standard solution, and V_{eq} is the amount of titrant (ml) consumed by 50ml KHP standard solution at the equivalent point.

The base number (BN) of a crude oil sample, in terms of mg KOH/g oil, is calculated as such:

$$\text{BN} = (V_{\text{eq}} - b_{\text{eq}}) \times N \times 56.1 / W_{\text{oil}}$$

in which, V_{eq} is the amount of titrant (ml) consumed by crude oil sample and spiking solution at the equivalent point, and b_{eq} is the amount of titrant (ml) consumed by 1ml spiking solution at the equivalent point.