Application Note

Moisture content measurement of hydrocarbons

Industry	Chemical
Instrument	Karl Fischer moisture titrator
Measurement method	Coulometric titration /Direct method
Standards	

1. Scope

Hydrocarbons with high lipophilic properties are used in paints, coatings, detergents, pesticides, polymers, and oil cleaners. Moisture is considered as an impurity of hydrocarbons, and if present at a level higher than a certain threshold, will negatively affect final product quality. This Application Note introduces examples of the moisture measurement of toluene, hexane, and cyclohexane with a Karl Fischer moisture titrator using coulometric titration (9. Notes). Each liquid hydrocarbon sample can be measured directly in the titration cell without any problem.

2. Precautions

Make sure to use an electronic balance accurate enough to measure 0.1mg increments.

3. Post-measurement procedure

Drain the reagent from the titration cell, then clean the titration cell, electrolysis electrode, and twin platinum electrode with methanol.

4. Apparatus

Equipment	Karl Fischer moisture titrator using coulometric titration methodology
Electrode	Twin platinum electrode, Two-component electrolytic electrode

5. Reagents

Anolyte	KEMAQUA Solvent AGE for General
Catholyte	KEMAQUA Catholyte CGE

6. Procedure

- Preparation -

1) Fill the titration flask with approximately 100 mL of anolyte.
2) Fill the inner burette with approximately 5 mL of catholyte.
3) Pre-titration is performed to anhydrate the inside of the titration cell.

- Measurement -

1) Collect a sample using a syringe and measure the mass.
2) Inject the sample from the syringe into the inlet of the titration cell and then measure the moisture content of the sample.
3) Measure the syringe mass after sample injection.
4) The difference in the mass of the syringe before and after injection of the sample is used as the sample collection volume.

7. Calculation

Moisture (%) = FA × ((Data – Drift × t – Blank) / (Wt1 - Wt2)) × k

FA	Correction factor (1.00)
Data	Titration volume (μg)
Drift	Drift level (μg/s)
Blank	Blank level (0 μg)
t	Measuring time (s)
Wt1	Sample + syringe (g)
Wt2	Mass of empty syringe (g)
k	unit conversion factor (0.0001)

8. Example of measurement

— Titration parameter —

＜Titr.Para＞

Titration mode	Normal
t(stir)	0 (s)
t(wait)	30 (s)
t(max)	0 (s)
Drift Stop	Rel.
Rel.	0.1 (μg/s)

＜Ctrl.Para＞

Cell type	2-comp.
Stable	0.1 (μg/s)
Control Gain	5.0
Electrolysis speed	Standard
End level	200 (mV)
Start mode	Auto
Data sampling time	5 (s)
Stirrer speed	3

（Listed above are example settings. Availability of settings may vary by instrument model.）

— Example of Titration curve —

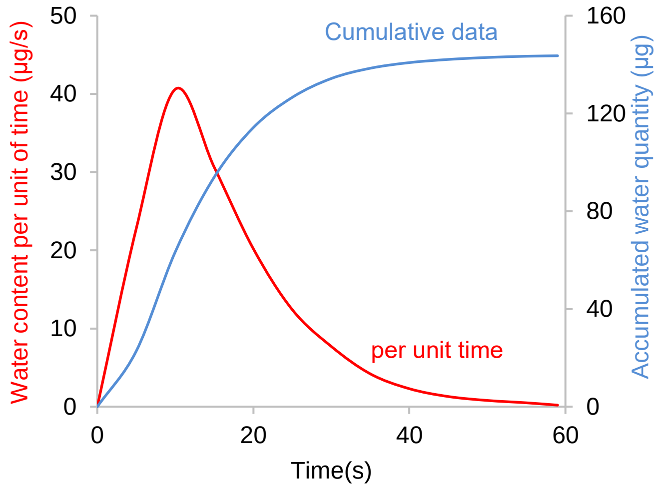

Fig.1 Measurement of toluene

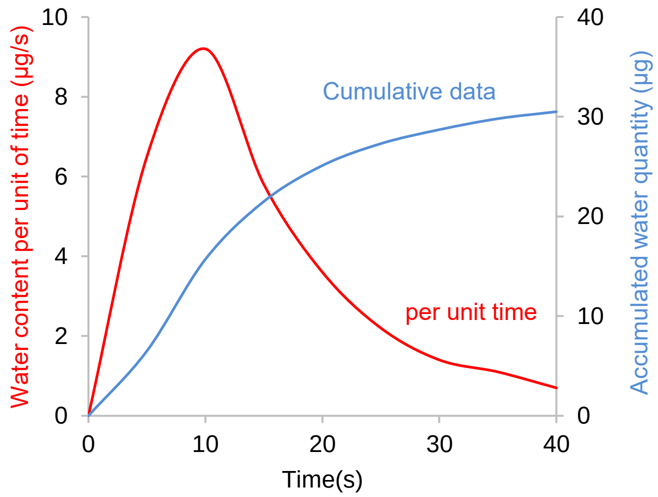

Fig.2 Measurement of hexane

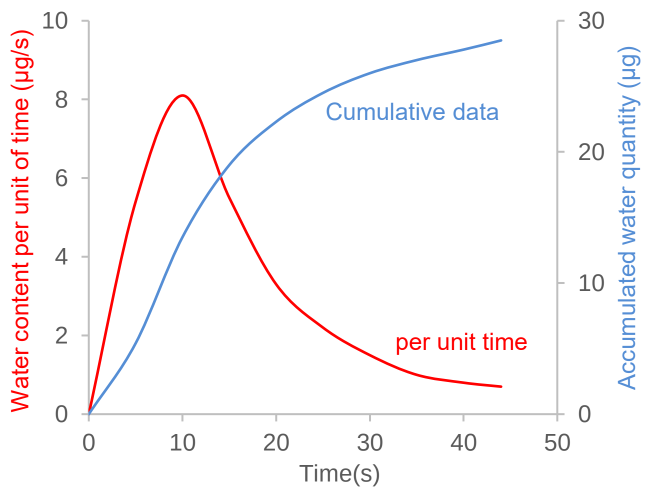

Fig.3 Measurement of cyclohexane

— Measurement results —

Table Results of moisture measurement

		Sample (g)	Moisture (µg)	Moisture concentration (%)
Toluene	1	0.8576	143.0	0.0167
	2	0.8911	149.6	0.0168
	3	0.8106	135.5	0.0167
	Mean			0.0167
Hexane	1	0.5981	27.9	0.0047
	2	0.6418	30.0	0.0047
	3	0.6860	31.9	0.0047
	Mean			0.0047
Cyclohexane	1	0.8237	28.2	0.0034
	2	0.7543	25.8	0.0034
	3	0.8118	27.5	0.0034
	Mean			0.0034

9. Notes

In general, hydrocarbons such as toluene, hexane, and cyclohexane do not usually interfere with the Karl Fischer reaction, but some unsaturated hydrocarbons can. Please contact us if you are not sure whether your sample can be measured or not.