

WATER DETERMINATION IN CHALLENGING SAMPLES

NEW! FREE OF ALCOHOLS (FA) HYDRANAL REAGENTS



Hydranal™ NEXTGEN Coulomat A-FA & C-FA are the first alcohol-free reagents for Karl Fischer (KF) titration that suppress side effects and provide consistent results for many challenging alcohol-sensitive samples.

Many samples, like lithium-ion battery (LiB) electrolytes or those with additives, undergo side reactions with alcohols in common KF reagents. This leads to an increase in drift, and delayed or no titration endpoint, rendering incorrect water content results. It can even make water determination impossible.

New Hydranal alcohol-free reagents suppress these side effects and allow accurate water determination, even in difficult samples. Additionally, the new formulation does not contain CMR (carcinogenic, mutagenic and reprotoxic) substances or halogenated hydrocarbons.

NEW HYDRANAL FA-TYPE REAGENTS

- Free of alcohols
- Recommended for Li-ion battery electrolytes
- No CMR classification
- High performance
- High accuracy

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Lithium-ion battery electrolytes are sensitive to humidity. Explosion of cell phone batteries is a known example of this. However, it is not easy to perform water determination in these samples.

Alcohol-based reagents for KF titration, like Hydranal-Coulomat AK or competitive Reagent M, are often unable to titrate LiB electrolyte samples.

Common electrolyte additives, such as vinylene carbonate (VC), fluoroethylene carbonate (FEC) or borates (e.g. lithium bis(oxalate)borate, LiBOB), cause strong side reactions leading to increased drift, missing end points and inaccurate results.

Hydranal NEXTGEN Coulomat A-FA & C-FA suppress side reactions and provide consistent performance and high accuracy even for difficult samples (see comparison on Fig. 1 and 2).

SAMPLE	COULOMAT A-FA + C-FA	COULOMAT AK + CG-K	REAGENT M
LiB electrolyte with VC/FEC	+	o	o
LiB electrolyte with LiBOB	+	-	-
LiB electrolyte with LiDFOB	+	-	-
Pure VC	+	-	-
Pure FEC	+	o	o
Pure LiBOB	+	-	-
Pure LiDFOB	+	-	-

- + accurate titration, suppressed side effects
- o limited titration (possible only for small amount of sample)
- no accurate titration possible (side reactions, increasing drift or inaccurate results)

VC - vinylene carbonate; FEC - fluoroethylene carbonate; LiBOB - lithium bis(oxalate)borate; LiDFOB - lithium difluoro(oxalato)borate

PRODUCT NUMBER	PRODUCT NAME	DESCRIPTION	PACKAGING
34471	HYDRANAL NEXTGEN Coulomat A-FA	Analyte for coulometric Karl Fischer titration of ketones and Li-ion battery electrolytes, preferred for cells with diaphragm, acetonitrile-based, free of alcohols (free of CMR substances)	500 mL
34470	HYDRANAL NEXTGEN Coulomat C-FA	Catholyte for coulometric Karl Fischer titration of ketones and Li-ion battery electrolytes, acetonitrile-based, free of alcohols (free of CMR substances)	10 x 5 mL ampoules

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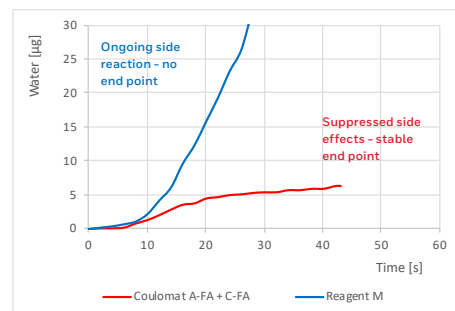


Fig. 1. Titration of 1 M LiPF₆ in EC/DMC with 5 wt% LiBOB.

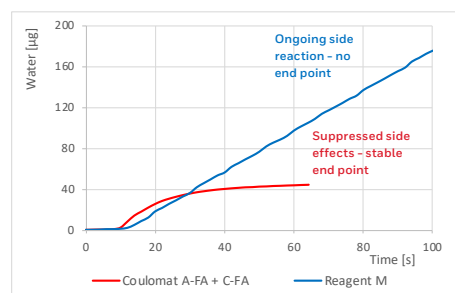


Fig. 2. Titration of pure VC.

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