

LI BATTERY ICP-OES E-METHODS PACK

Lithium-Ion Battery e-Methods Pack: All the Methods, None of the Complexity

The global need to develop new types of batteries is giving rise to a host of different analytical testing techniques needed to ensure the quality and safety of batteries and battery materials.

Among the preferred testing techniques is inductively coupled plasma optical emission spectroscopy (ICP-OES), and PerkinElmer's trusted Avio® Max ICP-OES series offers different reliable and robust solutions, depending on your application needs.

Our Li-ion Battery ICP-OES e-Methods Pack is a collection of materials to aid in analyzing specific sample types and contains all the critical knowledge you need to get started, including:

- Syngistix™ for ICP software methods for multiple battery components
- Sample preparation guides
- Consumables list
- Application notes

Comprehensive Li-ion Battery Analysis for Your Requirements

Our Li-ion Battery ICP-OES e-Methods Pack, available in Syngistix for ICP software version 5.5 or higher, contains method guides including sample preparation and instrumental setups. It includes suggested sample introduction and consumables information, all supported by Syngistix software, with prebuilt methods, including a guide showing how to add the methods to your current software.

With this e-Methods Pack, you'll benefit from:

- Staff Efficiency
- Time Savings
- Fast Setup
- Knowledge Repository

Plug 'n' Play



REQUEST YOUR PACK

What Kind of Results Can You Achieve?

ICP-OES is an ideal technique for the elemental analysis of Li-ion batteries for critical quality control and research, with major elements and impurities analyses being the most common applications. Below is the list of materials used in Li-ion batteries, including raw materials, cathode and anode materials as well as electrolytes.

Commonly Used Materials in Li-ion Batteries

Raw Materials	Cathode	Anode	Electrolyte
Li ₂ CO ₃	LiCoCO ₂ (LCO)	Graphite	Organic solvents:
CoCO ₃	LiMn ₂ O ₄ (LMO)	Silicon carbide	DMC/EC/DEC
CoO ₂	LiNi _x Mn _y Co _z O ₂ (NMC)		
MnSO ₄	LiNiCoAlO ₂ (NCA)		Salts: LiPF ₆
NiSO ₄	LiFePO ₄ (LFP)		

Each battery component can require different sample preparation, introduction components, and method parameters. With the right instrument and knowledge, these challenges can be overcome.

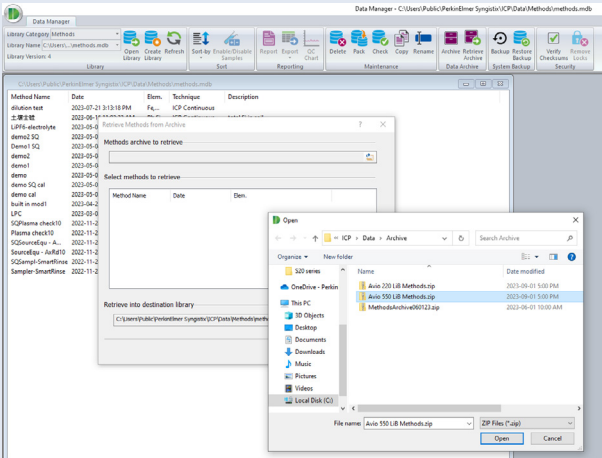
Difficult Matrices

For samples with high salt, acid, or organic solvent content, special consideration is given to sample preparation and sample introduction. For these samples, the Avio® 220 Max is the ideal ICP-OES system.





High-Purity Materials

When analyzing low-level impurities, it's important to quantify accurately, and our e-Method Pack gives you the information you need for high-sensitivity analysis, with the Avio 550 Max ICP-OES as your go-to system.


Plug 'n' Play



Easy to open in Syngistix software

Sample	Application	Instrument			
Li Ore	Major and Trace element analysis	ICP-OES Avio 550			
Instrument Set Up		Element Wavelength Selection			
Instrument parameters:		Analyses:			
Component / Parameter	Description / Value	Element	Wavelength (nm)	Element	Wavelength (nm)
View Mode	RealTime	Al	308.153	Mg	202.773
Torch	Concentric, Capillary Torch with 2.0 mm alumina injector	Ca	317.933	Mn	257.610
Nebulizer	Gas-Tight Cross-Flow	Fe	258.364	Ni	864.862
Spray Chamber	Radon Seal	K	766.490	P	213.618
Plasma Gas Flow	10 L/min	Li	670.784	Ti	324.540
Auxiliary Gas Flow	0.4 L/min	Sc (I.S.)			361.883
Nebulizer Gas Flow	0.65 L/min				
RF Power	1500 W				
Sample Introduction Rate	1.0 mL/min				
Read Time Range	Auto 1 - 5 sec				
Sample Aspiration Rate	Change (0.30 min/s)				
Internal Standard Tuning	Change (0.30 min/s)				
Drain Tuning	Hold (0.15 min/s)				
					
Options:					
					
HF Spray Chamber		PEEK Mini Mist			
Sample Concentrations in Calibration standards (mg/L)					
Li	5, 10, 20, 30				
Al	25, 50, 100, 200				
Fe	10, 25, 50, 100				
Co	0.25, 0.5, 1, 5				
Pb	0.25, 0.5, 1, 5				

For reference only - Adjustment of parameters may be required for optimal performance on individual instruments



Example of an e-method guide sheet

Sample	Application	Instrument
Li Ore	Major and Trace element analysis	ICP-OES Avio 550
Remarks		
• A warm-up time of 30 minutes are advised before performing the analysis.		
• Using Linear calculated intercept external calibration for all the elements.		
• To determine the Al2O3, either alkali fusion or microwave digestion with H2SO4/HF are required.		
Application Note		
• "Analysis of Lithium Ore with the Avio 550 Max ICP-OES", PerkinElmer Inc., 2021.		
Figure: Relative percent difference between flame AA and ICP-OES		
Figure: Relative percent difference between flame AA and ICP-OES		

PerkinElmer U.S. LLC
710 Bridgeport Ave.
Shelton, CT 06484-4794 USA
(+1) 855-726-9377
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

Copyright ©2024, PerkinElmer U.S. LLC. All rights reserved. PerkinElmer® is a registered trademark of PerkinElmer U.S. LLC. All other trademarks are the property of their respective owners.