

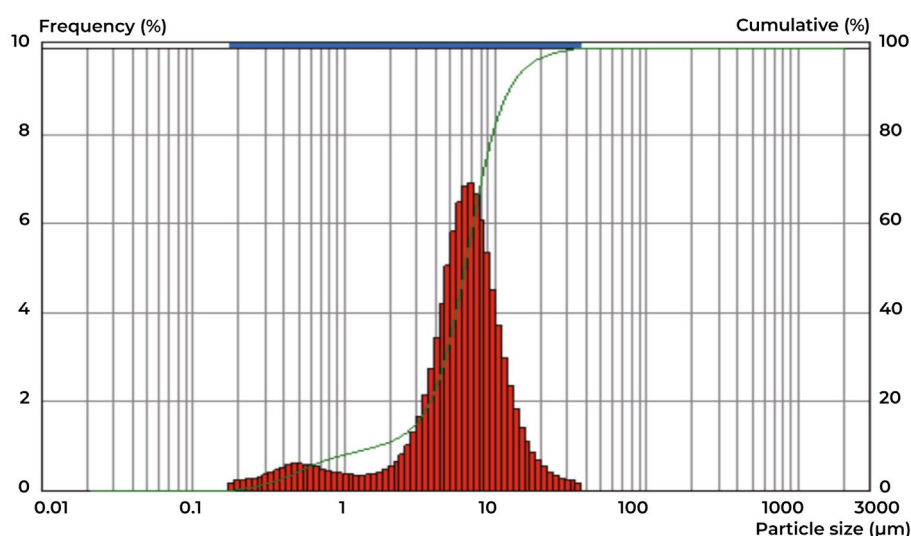
Evaluation of the Physical Properties of Secondary Battery Materials

Particle Size Distribution, Specific Surface Area/Pore Distribution Measurement

Example of particle size distribution measurement

Measurement of mixed samples yielded high-resolution and high-responsiveness data.

- Sample: Lithium cobalt oxide + high-conductive carbon materials
- Apparatus: Microtrac MT3300EX II
- Dispersion method: Dispersion medium: NMP
Ultrasound bath: 2 minutes



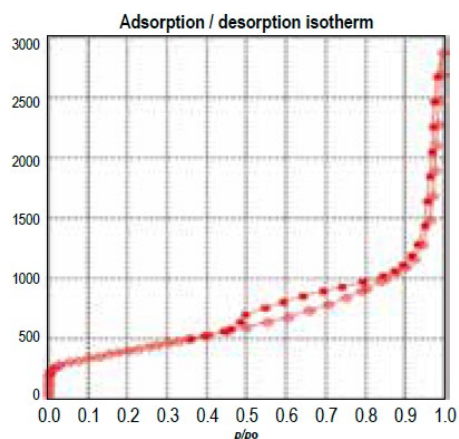
Example of electrode carrier evaluation

Evaluation of electrode carrier surface area for reduction of supported metal

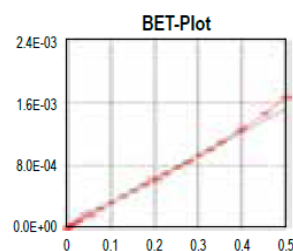
Evaluation of the aggregation status of primary particles

• Sample : High-conductive carbon material

• Apparatus : Automated Specific Surface Area/Pore Distribution Measurement System BELSORP-miniX



Start point 14 // End point 20
 Gradient 2.9759E-03
 Intercept 2.7467E-05
 Correlation coefficient 0.9999
 V_m [cm³ (STP) g⁻¹] 332.96
 $a_s.BET$ [m²g⁻¹] 1.4492E+03
 C 109.34
 Total pore volume [cm³g⁻¹] 4.1828
 ($p/p_0=0.990$)
 Mean pore diameter [nm] 11.545



Application

Particle size distribution measurement

- Cathode active materials
Lithium cobalt oxide
Lithium manganese oxide
- Conductive additives
Acetylene black
Carbon black
- Anode active materials
Natural / synthetic graphite
- Separator

Specific surface area / pore distribution, gas / steam adsorption measurement

- Evaluation of electrode catalyst carrier, reduction of supported metal
- Surface hydrophobicity / hydrophilicity evaluation
Surface state
Evenness / unevenness of surface state
- Differential adsorption heat evaluation
- Pore distribution / volume evaluation
Nano-structure control

Apparatus

■ Particle Size Distribution Measurement System Microtrac MT3000 II Series

- Measuring principle: Laser diffraction/light scattering
- Measuring range: 0.02-2800 μm
- Line-up consisting of 4 types for different measuring ranges (upgrading possible)
- Red three-beam semiconductor laser and unique detection mechanism
- Smooth switching between wet and dry measuring modes by adoption of an outer cell design
- Allows wet particle image analysis when combined with Microtrac PartAn SI



■ Specific surface area / Pore distribution measurement system BELSORP MINI X

- Measuring principle: Constant volume gas adsorption + AFSM
- Measuring range: Specific surface area: 0.01 m^2/g -
- Pore distribution: Diameter 0.7-500 nm (Optionally: Diameter 0.35-500 nm)
- Automated measurement of gas adsorption isotherm by the constant volume method, and measurement of specific surface area and pore distribution by the BET multi-point method.
- Adsorbed gas: N_2 and other non-corrosive gases
- Compact size, low price
- A pre-processor for adsorption measurement BELPREP VAC II / VAC III or BELPREP FLOW II is additionally needed.



For further information please contact us at:

www.microtrac.com