

# Influence of Processing Parameters on the Properties of Graphite Anodes for Lithium Ion Batteries

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Replacement of Li metal anodes by selected carbon and graphite materials marked the commercial breakthrough for lithium ion battery technology in the field of consumer electronics (1990). However, to utilize LIB for electromotive and stationary applications further improvements are mandatory.

The correlation between microstructural parameters and electrochemical properties of graphite already has been intensively investigated. Motivation for our work is to understand in more detail the influence of electrode processing parameters on the cell performance.

## Processing

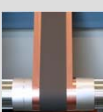


### Slurry

Graphite  
Carbon black  
CMC  
SBR  
Water



### Coating



### Calendaring

**Carbon**

- Degree of crystallinity.
- Particle size, morphology.
- Surface area (BET), surface chemistry.
- Particle coatings

**Slurry**

- Active material (carbon)
- Inactive materials (binder, conductive aid, thickener, wetting aid, dispersant).
- Mixing process – deagglomeration.
- Rheology.

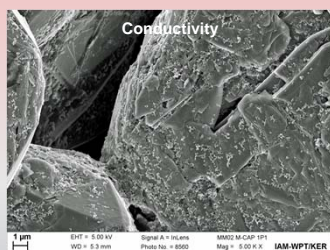
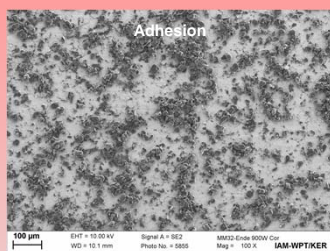
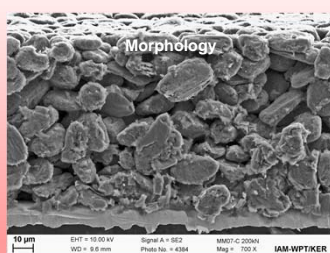
**Coating**

- Foil pretreatment – wetting behavior.
- Thickness homogeneity.
- In-line drying – vacuum drying.

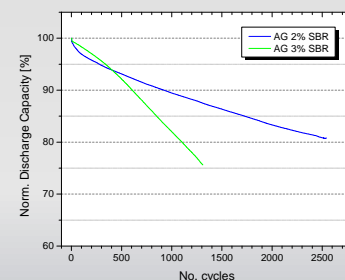
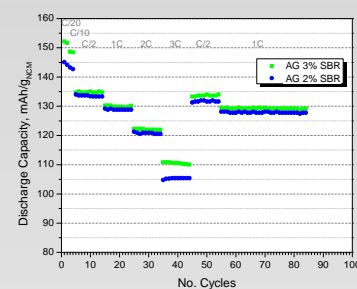
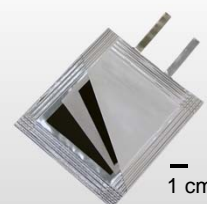
**Calendaring**

- Intensity: force, gap, temperature.
- Distortion, bending.

## Electrode



## Electrochemical Properties



### Electrode morphology

- Density – porosity, pore size.
- Areal mass loading.
- Homogeneity (binder distribution)
- Roughness.

### Adhesion strength

- Particle – particle.
- Particle – current collector (copper foil).

### Electronic conductivity

Capacity (reversible)

Capacity losses (irreversible)

Rate Capability

Degradation / Ageing

Reproducibility / Scattering  
(robustness)

## Acknowledgement

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