Fields of Application

Adhesive Tensile Strength

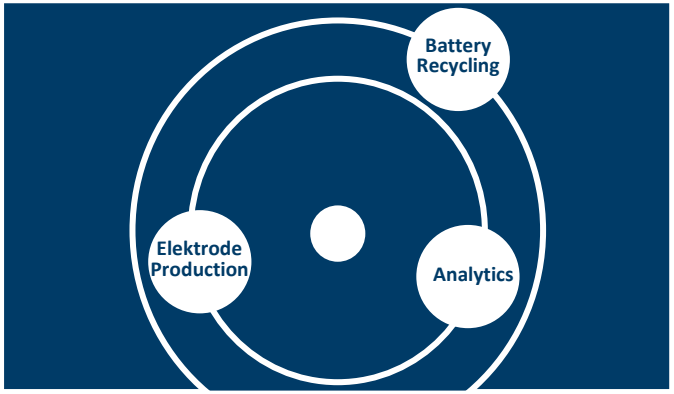
This method enables characterizing the composite strength of a material. It can be used for wood composite materials, coated materials or multilayer materials in the construction and paper industry and to characterize the adhesion of all other multilayer materials .

Powder Conductivity

This method measures the powder conductivity at a specific densification of powdery bulk solids. So mixing processes as for electrode production and innovative synthesized materials can be characterized. For example indium tin oxide is an very important transparent electrically conducting material in the opto-electronic industry.

Continuity Conductivity

The method is used to investigate materials on their electrical volume conductivity. It is especially suitable for non-metallic materials with a certain resistance (e.g. lightweight materials or polymer seals).



Lion Engineering GmbH

Lion Engineering is a spin-off of TU Braunschweig – Institute of Technology. It bundles process engineering expertise, established for years at the Institute for Particle Technology (iPAT), in production and in particular in recycling of li-ion batteries. The analysis of intermediate and end products enables process understanding and thus optimization of the processes.

Moreover, Lion Engineering realizes a sustainable process chain regarding the recycling of li-ion batteries and to benefit from the deep knowledge of the LithoRec process steps to support other companies and research institutions through advice, planning, active research and battery as well as production rejects recycling.

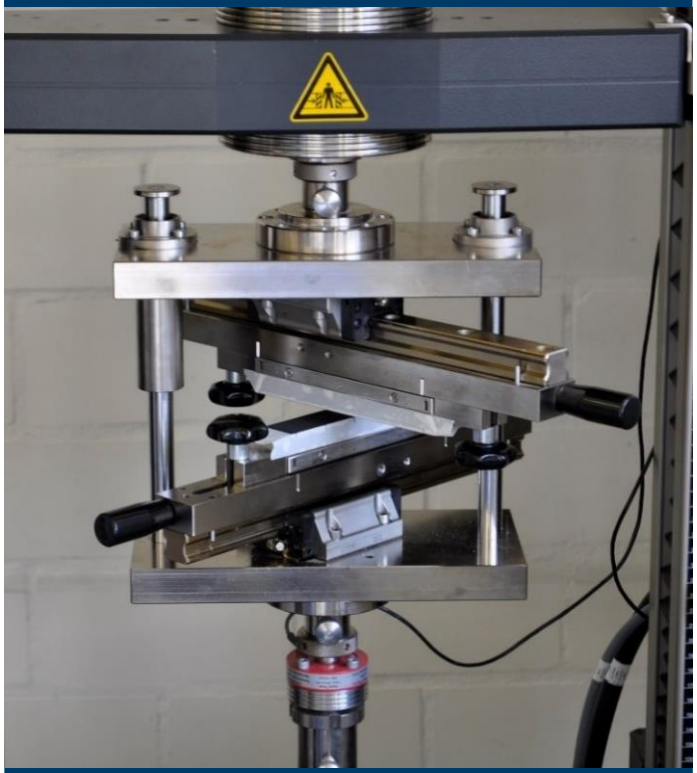
In addition, we develop and establish new analytical solutions from concept to finished design which are adapted for your requirements.

Lion Engineering GmbH
Rebenring 33
38106 Braunschweig
Tel. +49 531 380 435 1
Mobil. +49 162 622 529 6
Fax. +49 321 212 920 89
www.info@lion-eng.de
www.lion-eng.de

LION ENGINEERING

Electrical and Mechanical

Quality Analytics



Analysis of Powder and Solids

for Electrodes, Composites, and other High Performance Materials

Powder Conductivity

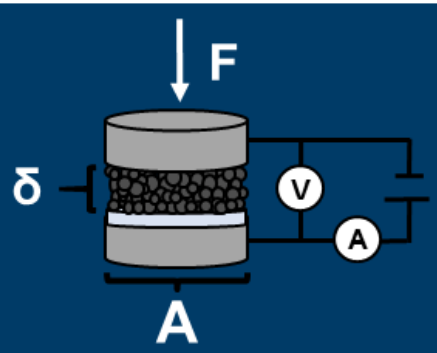
Electrical conductivity is the ability of a substance to conduct electrical current. This property is determined by the number of free electrons in a material. The conductivity of particle beds, however, is also influenced by the composition of the bulk, the arrangement of the particles and in particular by the characteristics of the particle-particle contacts.
The measurement of the conductivities is realized at defined pressure which affects the contact resistance significantly.
The method provides for example, an insight on the success of a dry mixing step, or the alteration of the material properties by physical or chemical modification.

Furthermore, the bulk density is measured simultaniously, which provides a first indication for the compressibility of the used powders.

Conductivity

Electrical conductivity of a material is exceedingly dependent on the chemical composition and the availability of the mobile charge carriers. In particular in multi-component systems such as electrodes, the distribution of the conductive materials within the structure has an essential influence. On the cathode side the carbon black network, as electron transport network, is almost exclusively responsible for a sufficient electrical connection of the active material particles to the current collector. Dispersing and drying processes influence the formation of this network, since the conductive particles are distributed and the fixation of the electrode structure proceeds. The method is suitable to evaluate the impact of material and process parameters and gives a first indication on the expected electrochemical performance. The formula below shows the reciprocal of conductivity, the specific resistance.

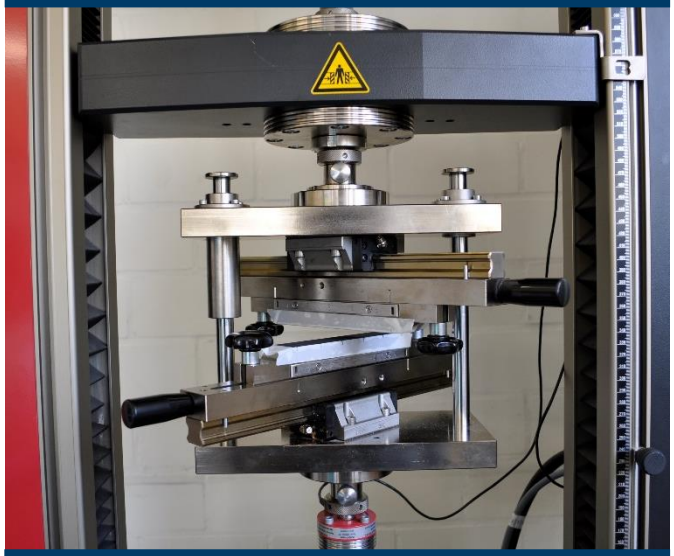
Electrical Continuity Measurement



$$\rho = \frac{\left(\frac{U}{I}\right)\cdot A}{\delta} = 1/\sigma$$

Adhesive Strength

The determination of the adhesive tensile strength of the electrodes serves as a characteristic value for the adhesion of the coating to the current collector and the cohesion within the coating. With the adhesive tensile strength the various influences of the processing on the composite structure of the electrode can be examined. Besides the influence of process parameters, in particular formulation and material influences affect the adhesion of the electrode.
The amount of added binder, the layer thickness or the particle size distribution of the materials are such parameters.



Insufficient adhesion between the substrate and the coating could result in handling problems within automated cell manufacturing processes. Furthermore a premature capacity loss by an electrical disconnection of parts of the electrode.