The Fraunhofer Battery Alliance, consisting of 19 Fraunhofer institutes, carries out research in the field of electrochemical energy storage devices (batteries and super-capacitors) in order to develop technical and conceptual solutions for commercial applications. Particular attention is paid to the social, economic and ecological implications of the technology.

Beside materials, systems, simulation and testing, a further competence of the Alliance is in the field of cell production.

Competences and fields of work
The Fraunhofer Battery Alliance develops innovative electrode materials and provides the opportunity to further develop these materials for use in industrial products, through a close collaboration with partner institutes.

Cell development
The advancement of existing cell systems and research into future technologies (lithium-air, lithium-sulfur, etc.) are a key area of work within the Battery Alliance. The main focus is on new materials and material formulations for electrodes, new electrolyte systems and separators. The Alliance also works on enhanced manufacturing processes, which lead to an increase in cell performance, decreased costs and/or the reduction of harmful emissions.

In addition, lithium cells can be tailored to suit the requirements of specific applications. A focus on pouch cells enables a flexible component design. Cells and cell modules constructed in this way can be fitted precisely into the available space.
Other parameters that are important for a comprehensive understanding of the electrochemical processes such as, for example, cycle stability, internal resistance and aging behavior, can be determined within a wide temperature range (-40 to +180 °C) for both full- and half-cells. For this process, numerous testing circuits are available with maximum currents between 100 mA and 100 A.

Pilot plant and small-scale production

Our institutes operate special pilot plants for transferring results obtained in the laboratory to industrial scale. In these plants, all stages of the production of electrochemical cells can be carried out. Within the process chain for the manufacture of lithium-ion batteries, the steps of slurry mixing and coating are especially critical as even small variations in the parameters have a direct impact on the battery cell quality. The processes systematically developed in R&D are therefore up-scaled and optimized using several mixers, coating units and subsequent assembly units. The production capacities are shared with industrial partners and ensure the rapid implementation of research findings into small-scale production, while industrial customers also profit from this process know-how.