

Heraeus Porocarb®

Join the next generation of advanced lithium-ion batteries

1st Generation



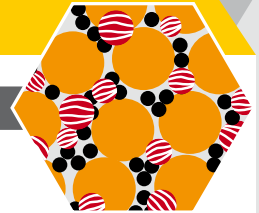
- **Carbon black**
 - Primary Particle Diameter: Tens of nanometers
 - Aggregate size: Hundreds of nanometers
 - Within the electrode:
 - Provides short distance electronic paths
 - Contributes to micro- and mesoporosity
 - Obstructs macroporosity

2nd Generation



- **Carbon nano fiber and Carbon nano tube**
 - Diameter 15 nm (CNT)–150 nm (CNF)
 - Length 3–8 µm up to 100 µm (CNF)
 - Within the electrode:
 - Provides middle or long distance electronic paths
 - Contributes to micro- and mesoporosity
 - Obstructs to a lesser extent macroporosity

3rd Generation



- **Porocarb®**
 - Diameter: 2 grades available < 10 µm, 10–30 µm
 - Within the electrode:
 - Creates ionic and electronic conductive pathways
 - Provides defined meso- and macroporosity
 - Maintains open porosity

STATE OF THE ART

< 5 % INCREASE IN ENERGY DENSITY DUE TO THE REDUCTION OF REQUIRED BINDER AND CONDUCTIVE ADDITIVE

Porocarb®

20 % INCREASE IN ENERGY DENSITY THROUGH INCREASED ELECTRODE LOADING AND SAVINGS IN INACTIVE COMPONENTS

Heraeus New Businesses

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