SPECIALTY GRAPHITE FOR NEGATIVE ELECTRODES OF LITHIUM-ION BATTERIES

C-NERGY™ L-SERIES is a specialty graphite range especially designed for the negative electrodes of lithium-ion batteries.

**Key Features**
- Enables the utilization of cheaper active materials in the negative electrode
- Enables reduced additive dosage in the negative electrode
- Reduction of global additives costs (in negative and in positive electrodes)
- No additional pre-dispersing unit is required
- No need of a dispersing agent
- Faster electrolyte absorption
- Higher production outputs

<table>
<thead>
<tr>
<th>PRODUCT CHARACTERISTICS</th>
<th>APPLICATION BENEFITS</th>
</tr>
</thead>
</table>
| **Very High Purity**                            | - Increased battery safety  
- Lower rejection rate  
- Fully compatible with most electrolyte systems |
| **Very High Electrical Conductivity and Reversible Capacity**  | - High energy density  
- Extremely high cycling stability  
- High charge acceptance  
- Lower dosage required vs conventional graphite grades |
| **High Density and Low Spring Back**            | - High energy density  
- High charge acceptance  
- Minimal electrode expansion after pressing  
- Improved electrode flexibility  
- Facilitate the addition of other conductive additives |
| **Very Efficient Electrolyte Wettability**      | - Costs reduction thanks to faster dispersion in water based electrode slurry  
- Costs reduction thanks to a faster electrolyte filling step during battery assembly  
- Improved battery performance due to more efficient anode wetting  
- Lower dosage required vs conventional graphite grades  
- Reduced global additives costs |
RECOMMENDED USE

The unique characteristics of C-NERGY™ L-grades give unmatched performance improvements in Li-ion batteries.

**Recommended C-NERGY™ L-grades dosage in negative active material:** 2-8 wt%.

C-NERGY™ L-grades build a graphite additive matrix that facilitates the addition of other conductive additives.

Better performance is obtained when C-NERGY™ L-grades are used in combination with ca. 1 wt% of C-NERGY™ SUPER C65 or C-NERGY™ SUPER C45 carbon black.

**Typical Product Properties**

<table>
<thead>
<tr>
<th>Product</th>
<th>Ash (%)</th>
<th>Fe (ppm)</th>
<th>Cl⁻ (ppm)</th>
<th>SO₄²⁻ (ppm)</th>
<th>AMOUNT OF MAGNETIC PARTICLES/GRAM OF PRODUCT</th>
<th>TIME TO ADSORB DMC ELECTROLYTE SOLVENT (msec)</th>
<th>TIME TO ADSORB WATER (msec)</th>
<th>ELECTRODE DENSITY (g/cm³)</th>
<th>SPRING-BACK (%)</th>
<th>REVERSIBLE CAPACITY (Ah/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFG15L</td>
<td>0.01</td>
<td>10</td>
<td>5</td>
<td>25</td>
<td>&lt;1</td>
<td>100</td>
<td>300</td>
<td>&gt;1.75</td>
<td>10</td>
<td>370</td>
</tr>
<tr>
<td>SFG15</td>
<td>0.07</td>
<td>40</td>
<td>10</td>
<td>40</td>
<td>3</td>
<td>200</td>
<td>500</td>
<td>&gt;1.75</td>
<td>10</td>
<td>370</td>
</tr>
<tr>
<td>KS15L</td>
<td>0.01</td>
<td>10</td>
<td>5</td>
<td>25</td>
<td>&lt;1</td>
<td>200</td>
<td>400</td>
<td>&gt;1.75</td>
<td>13</td>
<td>355</td>
</tr>
</tbody>
</table>

¹ defined as time it takes to reach a contact angle of 0°

More data available on request