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trode material, and charge/discharge proceeds by migration of lithium ions between the two electrodes. In order to realize long-time operation and large current charge/discharge as a battery, two types of performance are

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sphase sphere graphite as a high performance negative electrode material responding to these requirements[1-3]. This report introduces the features and performance of the developed material.

2. Mesophase Spheres

JFE Chemical is one of the world's leading tar distillation manufacturers using coal tar produced as a byproduct of iron and steel production as a feedstock, and is also involved in the development of high value-added tar pitch products[1-5]. When heat treatment is applied to coal tar pitch, layers of aromatic rings, which spreads as a result of condensation and polymerization, form a

shows an example of a polarized micrograph of mesophase spheres generated by heat treatment.

Mesophase spheres can be separated from the pitch matrix by using an appropriate solvent. Due to the structural feature of mutually-aligned crystallite, mesophase spheres have the property of easy graphitization by high temperature heat treatment, and thus are classified as graphitizable carbon. In general, the shape of graphite materials tends to become fat as crystallinity increases.

20 μm

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capacity decreases rapidly when the discharge rate exceeds 1 C. In contrast, high capacity KMFC™ graphite powder maintains a discharge capacity of approximately 95% even at a high discharge rate of 2.5 C.

4. Conclusion

The new high capacity KMFC™ graphite powder developed by JFE Chemical realizes a high capacity of 360 mAh/g, which corresponds to approximately 97% of the theoretical value. Furthermore, because the particles are spherical in shape, this material displays totally high performance as a negative electrode material, including an excellent discharge rate property, etc. Longer time operation and larger current charge/discharge are required in lithium ion secondary batteries, and the developed graphite powder is a negative electrode material which satisfes these expectations.

JFE Chemical has continued to produce mesophase spherical graphite over a long period since beginning commercial production in 1987. In the future, the company will conduct research and development to achieve further improvements in performance so as to deliver products that meet the needs of the times with stable quality.

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