

Yamagata Yonezawa Area

Development of New Carbon Materials and Secondary Lithium-ion Cell with High-speed Charging and Discharging

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Yamagata University

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Academia...Yamagata University

Typical result of City Area Program

1. Carbon system new material development that makes excellent rice bran calcinations material and chaff in strength and water resisting property raw material

Strength and the water resisting property that was the problem in a conventional rice bran scorch green wood are greatly improved, and the usage has expanded greatly as the development such as bearings in which it aimed at use in the field where strength and the water resisting property are required becomes possible as a result. Moreover, it succeeded in the development of carbon system new material "RHS carbon" that made chaff a raw material. Since development and the material of making to the fine powder of an unlubricating, a high water resisting property, and a change with the lapse of time. It has also a quality bearings used based on this material, the application to various fields such as materials for V rib belt and the battery is expected.



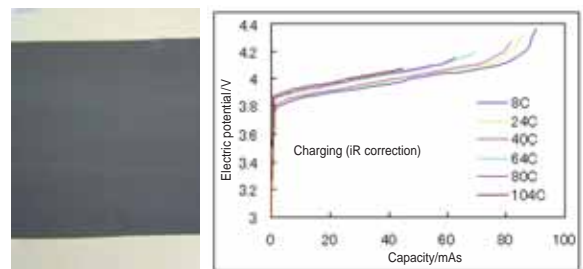
Direct bearing made from porous carbon materials



Burned chaff material RHS carbon

2. Success in making of rapid electrical charge and discharge electrode trial manufacture

The factors governing the electrical charge and discharge speed of the battery was clarified. It succeeded in the trial manufacture of the electrode, which enabled the electrical charge and discharge in 30 seconds.

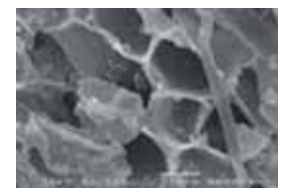


Electrode prototype and its cell characteristics (charging)

About the approach after the project

1. Improvement and use of high performance and calcination porous material

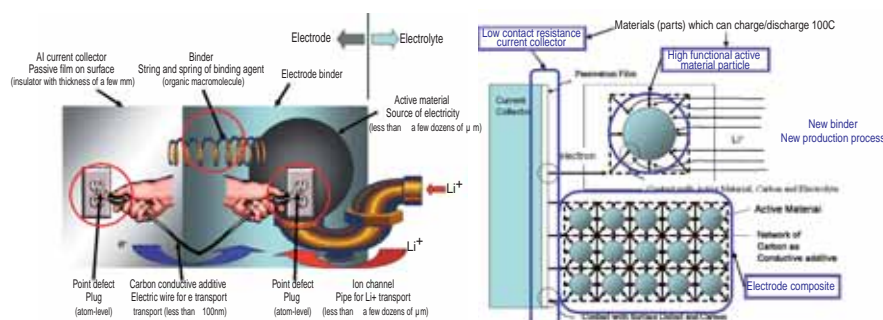
With the use of functions of the high performance porous carbon materials such as a high water-resisting property, low wear, and less change with the lapse of time, the development continues to seek unlubricating sliding products that can be widely used for the relevant apparatus in the fields of foods, medical treatment and the coating etc.



Natural porous structure of chaff

2. Power system application of high-speed electrical charge and discharge lithium ion secondary battery

For the lithium ion secondary battery, the basic technology to optimize its electrode component was developed. Its complex electrode components and functions were clarified, and the principles of its rapid charging and discharging were also established. Furthermore, a production technology to create a electrode structure for practical use of the battery aiming at application to the secondary battery for electric vehicles. The function as the negative electrode for the lithium cell has been confirmed as for an efficient porous carbon material, and the expectation turned to be for practical use. It leaves up the venture company now, and there is figure aiming at the battery manufacturing base construction in U.S. market.



Electrode function and structure optimized model