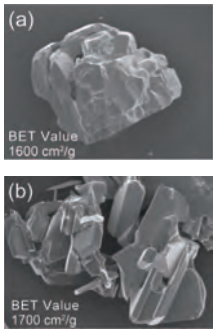
Powder raw material for SiC bulk single crystal growth developed to realize high sublimation rate

Possible to significantly improve the growth rate to about twice the current rate

We have developed high purity SiC powder as a raw material for the sublimation method capable of high-speed growth of silicon carbide (SiC) bulk single crystals for power semiconductors. The developed SiC powder has a particle shape capable of improving the growth rate to about twice the current rate without greatly changing the temperature condition in the current manufacturing process. Utilizing the gas permeability of the powder, sublimation gas from the SiC powder raw material can be easily released. Only the replacement of the conventional SiC powder raw material with the developed one enables high-speed growth of SiC bulk single crystals and thus enables cost reduction and process simplification due to time reduction in the high temperature process. In addition, this powder manufacturing method was developed by improving the Acheson method, which is a mass production technology for conventional SiC abrasives, featured by higher purity and higher mass production characteristics.

Enlarged photographs of (a) Acheson powder and (b) developed SiC powder having almost the same specific surface area (BET value)



Sample name	True density	Specific surface area (cm^2/g)		Sublimation ratio (%/h)
		BET method	Blaine method	
Acheson method	3.08	1600	280	8.1
Developed SiC powder	3.02	1700	540	17

True density, specific surface area and sublimation characteristics of each powder shown in Figure (a) and (b)

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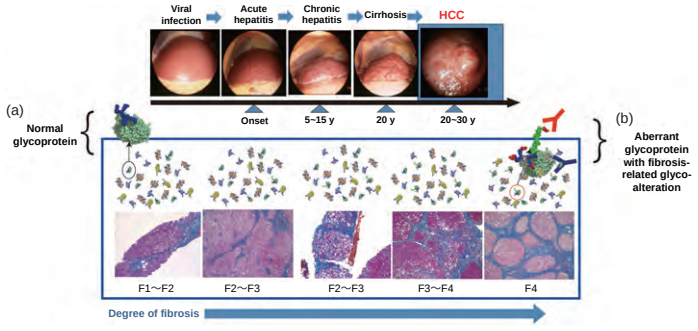
Simple and accurate liver fibrosis measurement system with a glyco-diagnostic agent

Evaluating the degree of liver fibrosis in patients with chronic hepatitis B/C using a fully automated immunochemistry analyzer.

We have completed the development of a glyco-diagnostic kit for the direct measurement of fibrosis adopting a doughnut-shaped and heavily glycosylated macromolecule, Mac-2 binding protein (M2BP), as a target glyco-biomarker. This molecule has a unique feature, which led us to pick it up from huge numbers of candidates assigned through glycoproteomics-based biomarker search. The diagnostic utility of M2BP is greatly owing to the favorable density and orientation of the disease-related glycans on the homomultimer resembling a “sweet-doughnut” covered with plenty of sugar of interest. We therefore selected the most robust lectin using a microarray-based method with a unique subtraction process. Subsequent biochemical studies indicated that the interaction between the resultant *Wisteria floribunda* agglutinin and the sweet-doughnuts was remarkably strong and specific, so that we could develop the rapid (17 min) and highly sensitive assay realizing “on-site diagnosis”. The validation study is currently on-going, in which the assay of sera from more than 5,000 patients from 15 clinical sites has been finished so far.



Quantitative alteration of a glycoprotein isomer with fibrosis-related glycosylation change

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