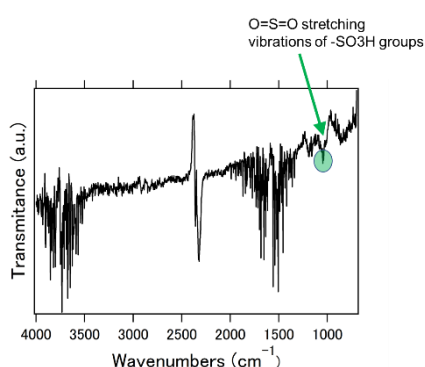
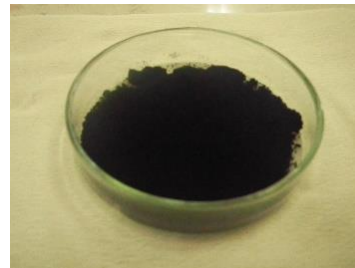


Carbon Type Solid Acid Catalyst

We have developed carbon type solid acid catalyst based on years of our experience in the field of organic pigment, functional material manufacturing technology, industrial powder fine grinding, nano size particle dispersion, synthetic technique. Solid acid catalyst is widely applied for oil refinery, organic synthesis in the world. In addition, they can be utilized for decomposition of heavy hydrocarbons, chemical transfer of biomass materials, replacement of currently used catalysis for various types of organic synthesis. Already existed solid acid catalyst are zeolite, meso porous materials, hetero poly acid, sulfonated zirconia, sulfonated nano graphene etc... Among them, most known solid acid catalyst is the amberlyst although they are very expensive and have difficulty as becoming massive quantity catalyst for industrial use. Recently, new types of solid acid catalyst as carbon based solid acid catalyst became in a hot topic and actively under research. p-toluene sulfonated acid, camphorsulfonic acid and sulfonated acid have the same catalytic effect as carbon based solid acid catalyst. However, these liquid catalyst chemicals are assumed to be thrown away after use and even one tries to reuse or correct them, it is not economically friendly and troublesome. Especially sulfonated acid, is the indispensable catalyst for oil refinery, raw materials for various types of chemical, pharmaceutical products, and catalyst for bio fuel such as bio ethanol, bio diesel. However, sulfonated acid can not be recycled and needs



IR spectra of carbon based solid acid catalyst prepared in our company. Sulfonate group can be observed.

to be separated from products by any means such as neutralization. Therefore, that will cost much energy and money. Hence, over 15 million tons of sulfonated acid is consumed per year as non recyclable catalyst which burdens the environment because of huge quantity of energy use and waste. Furthermore, safety and maintenance of manufacturing factory is always the

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predicament since sulfonated acid has high toxicity and corrosiveness. Therefore, it is the large progress if one can replace the current sulfonated acid process with more facile environmentally friendly process in the chemical industry.

In this regard, solid acid catalyst can be corrected again after use by simple filtration. Our carbon type solid acid catalyst exhibits higher catalytic efficiency compared to other solid acid catalyst. In addition, we aim for the carbon based solid acid catalyst products cost cheaper than expensive solid acid catalyst such as amberlyst, for real industrial purpose. We will keep searching for better efficiency and please consult with us anytime including detail technical issue.

GS Alliance Co., Ltd.
2-22-11 Obana, Kawanishi, Hyogo 666-0015 JAPAN
Phone: +81-72- 759-8501 Facsimile: +81-72- 759-9008
Web : <http://www.gsalliance.co.jp/>