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1. Main research results

- 1) Carbon based solid acid with 4 mmol g⁻¹ of SO₃H groups has been synthesized, exhibiting remarkable catalytic performance.
- 2) It was found that Phosphoric acid/niobic acid functions as an efficient solid catalyst for the conversion of glucose into 5-hydroxymethylfurfural
- 3) A hydrogenation catalyst able to decompose lignin into water soluble aromatic compounds has been synthesized.

2. Original papers

- 1) Kiyotaka Nakajima, Mai Okamura, Junko N. Kondo, Kazunari Domen, Takashi Tatsumi, Shigenobu Hayashi, and Michikazu Hara, "Amorphous Carbon Bearing Sulfonic Acid Groups in Mesoporous Silica as a Selective Catalyst", *Chem. Mater.*, **2009**, 21, 186 - 193.
- 2) Michikazu Hara, "Environmentally Benign Production of Biodiesel Using Heterogeneous Catalysts", *ChemSusChem*, **2009**, 2, 129 - 135.
- 3) Daizo Yamaguchi, Masaaki Kitano, Satoshi Suganuma, Kiyotaka Nakajima, Hideki Kato, and Michikazu Hara, "Hydrolysis of Cellulose by a Solid Acid Catalyst under Optimal Reaction Conditions", *J. Phys. Chem. C*, **2009**, 113, 3181 - 3188.
- 4) Masaaki Kitano, Daizo Yamaguchi, Satoshi Suganuma, Kiyotaka Nakajima, Hideki Kato, Shigenobu Hayashi, and Michikazu Hara, "Adsorption-Enhanced Hydrolysis of α -1,4 Glucans on Graphene-Based Amorphous Carbon Bearing SO₃H, COOH, and OH groups", *Langmuir*, **2009**, 25, 5068 - 5075.
- 5) Masaaki Kitano, Keisuke Arai, Atsushi Kodama, Tsutomu Kousaka, Kiyotaka Nakajima, Shigenobu Hayashi, and Michikazu Hara, "Preparation of a sulfonated porous carbon catalyst with high specific surface area", *Catal. Lett.*, **2009**, 131, 242 - 249.
- 6) Akira Nakajima, Katsuhiko Horie, Michikazu Hara, Masaaki Kitano, Toshihiro Isobe, Yoshikazu Kameshima, and Kiyoshi Okada, "Preparation of solid acid carbon coating on the surface of TiO₂ by photo-CVD of gaseous aromatic hydrocarbons", *Catal. Commun.*, **2009**, 10, 1670 - 1673.
- 7) Masaaki Kitano, and Michikazu Hara, "Heterogeneous photocatalytic cleavage of water", *J. Mater. Chem.*, **2010**, 20, 627 - 641.
- 8) Satoshi Suganuma, Kiyotaka Nakajima, Daizo Yamaguchi, Masaaki Kitano, Hideki Kato, Shigenobu Hayashi, and Michikazu Hara, "Synthesis and Acid Catalysis of Cellulose-Derived Carbon-Based Solid Acid", *Solid State Sciences*, in press (Manuscript No.:

SSSCIE-D-09-00023R1).

- 9) Michikazu Hara, "Biodiesel Production by a Carbon Catalyst", *Top. Catal.*, in press.
- 10) Michikazu Hara, "Biomass conversion by a heterogeneous catalyst", *Energy & Environmental Science*, in press.

3. International conference

Plenary

- 1) M. Hara, "Plenary Lecture: Hydrolysis of Cellulose by a Solid Catalyst. Acid Catalyzed Reaction at Solid-Solid Interface", 6th world congress on Catalysis by Acids and Bases (ABC-6), May 10-14, 2009, Genova, Italy.
- 2) M. Hara, "Invited Lecture: Cellulose Saccharification by a Carbon-Based Solid Acid", 1st Annual Chemical Sciences and Society Symposium (CS3), July 23-25, 2009, Kloster Seon, Germany.

Oral

- 1) S. Suganuma, K. Nakajima, D. Yamaguchi, M. Kitano, S. Hayashi, and M. Hara, "Hydrolysis of Cellulose by SO₃H-Bearing Carbon Catalyst", 3rd International Conference on Science and Technology for Advanced Ceramics (STAC-3), June 16, 2009, Yokohama, Japan.