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| הפקולטה להנדסה כימית  ע"ש וולפסון |  |  |
| The Wolfson Department of Chemical Engineering |  |  |

**Wolfson Department of Chemical Engineering Seminar**

**Wednesday, July 28th, 2021 at 13:30**

**Supported Sn Catalyst in Glucose Isomerization to Fructose**

**Han Wang**

Department of Chemical Engineering, Technion-Israel Institute for Technology

**MSc Seminar**

Advisor: Professor Oz M. Gazit

In the current circumstances, fossil feedstock is utilized as the main source for fuels and chemicals synthesis. However, its finite reserve and unfavorable effect on environment drive us to search for other more sustainable resources. Biomass is a renewable and abundant source, which is locally accessible and has a lower impact on the environment. Plant waste such as agricultural wastes and forest residues comprise cellulose, a polymer of glucose, which can be used as a building block for many chemicals. The glucose isomerization to fructose is a crucial first step to produce valuable chemical intermediates such as 5-hydroxymethylfurfural (HMF), which can be further upgraded to fuels, pharmaceuticals and plastics. In addition, glucose isomerization to fructose is prioritized as an essential reaction in food industry for the high production of food additive.

Currently, the isomerization of glucose is catalyzed by enzymes, which serves as a bottle neck for making this process in larger scales. Hence, in recement years great efforts are being made to develop a synthetic heterogeneous catalyst that is highly selective. The Lewis acid metal Sn immobilized on beta zeolite, has gained popularity in the past ten years as a promising water compatible solid catalyst for this reaction. The tetrahedrally coordination of Sn-OH site was revealed as the active site and the vicinal silanol group on zeolite was shown to directly participates in hydride transfer, which is rate-limiting step of this reaction.

In my work, I evaluate the immobilization of Sn sites on fumed silica as weak acidic support and on MgO as basic support. We found that the Sn/MgO catalyst outperforms the Sn/SiO2, which prompted us further examine the Sn/MgO catalyst. Catalytic testing on a suit of Sn/MgO was conducted to gain insights of effect of Sn loading. Characterization methods XRD, UV-vis, FTIR, TGA shed light on the relationship between catalytic behavior and catalyst structure together with surface property.

**Refreshments will be served at 13:15**

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**Wolfson Department of Chemical Engineering Seminar**

**Wednesday, July 28th, 2021 at 13:30**

**Correlating Properties of the Mn2O3-Na2WO4/SiO2 Catalyst with Statistically Estimated Parameters for the Oxidative Coupling of Methane**

**Baoting Huang**

Department of Chemical Engineering, Technion-Israel Institute for Technology

**MSc Seminar**

Advisor: Prof. Oz M. Gazit

Department of Chemical Engineering, Technion-Israel Institute for Technology

A highly promising route for methane utilization is converting it into chemical compounds that benefit the chemical industry. Ethylene for instance is a great candidate, commonly used as the feedstock to produce plastic in the industry. The direct route for the conversion of methane into ethylene is known as the Oxidative Coupling of Methane (OCM).

The Mn2O3-Na2WO4/SiO2 catalyst is one of the most promising candidates for the commercialization of OCM. However, the complex and convoluted behavior of the Mn2O3-Na2WO4/SiO2 catalyst for the oxidative coupling of methane makes it challenging to identify key catalyst parameters that govern catalytic performance.

Herein, parameter-to-performance correlations are obtained using a simplified methodology that involves cross-referencing various experimentally measured catalyst parameters with statistically estimated reaction kinetics parameters. These correlations and conclusions are shown to be consistent with literature data and shed light on key properties for good catalytic performance of this catalyst.

In this seminar, I will present the ideology of the correlation analysis and what we have concluded for a better performance of this catalyst.

**Refreshments will be served at 13:15**