



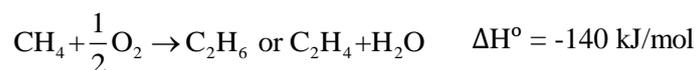
Wolfson Department of Chemical Engineering Special Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday July 19th at 1:30pm

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Critical Surface Parameters of Mn-Na-W/SiO₂ as a Solid Catalyst for the Oxidative Coupling of Methane

The proven reserves of natural gas are rapidly increasing over the years. Unfortunately, natural gas is highly underutilized as there are no feasible ways to directly convert large amounts of it into high value chemicals. One of the most attractive routes to convert natural gas is the oxidative coupling of methane (OCM) to directly make ethylene, which is a vital building block in the chemical industry with an expected increase in demand. However, this process is still industrially inapplicable due to the lack of active and selective catalyst.



Mn-Na-W/SiO₂ is one of the most promising catalysts for OCM. However, the exact criteria that make this catalyst superior to others are not fully understood. In this seminar, I will focus on understanding the convoluted processes occurring on the catalyst surface. The complex relationship between the chemical and physical properties of the catalyst surface are shown to be correlated to catalytic activity and selectivity of this catalyst. This is demonstrated experimentally by synthesizing a set of Mn-Na-W/SiO₂ catalysts with different surface properties, their characterization and testing under OCM conditions.

Karen Tankus

MSc student (advisor: Assoc. Prof. Slava Freger)
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Critical Oil-water separation using carbon – based membranes

The oil industry's main side product is a mixture of water and oil, known as produced water. After primary separation of most oil, produced water still contains a combination of dissolved oil and residual oil in colloid form. Environmental reasons dictate a strict regulation, whereby the discharged water has to contain a low concentration of residual oil thereby an efficient technological solution for complete oil-water separation is required. Filtration, regular or membrane, is a cost effective solution when it comes to water purification. Porous, non-woven mats made of ultra-long carbon nanotubes (CNTs) can offer a good compromise between the two, once rendered hydrophilic, as their porosity and pore size of ~30 nm potentially offer both high filtration rates, thanks to its porosity, and a high oil rejection rate and high breakthrough pressure minimizing the risk of oil leaking through the membrane. Preliminary results on model oil-water mixtures demonstrate high water permeability and oil separation efficiency of CNT sheets and confirm their potential for treating produced water. This approach also has the potential to improve water treatment in other industries producing oily waste effluents that need to be treated prior to discharge.