

Energy Colloquium

Synthesis of Alternative Fuels and Chemicals from Fossil and Renewable Feedstocks

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ABSTRACT:

Sustainable energy production and consumption are key challenges for the modern society. Forecasts by the International Energy Agency (IEA) show that the energy demand will increase by a factor of 40% with respect to current levels by 2030 with the increasing share of renewables. Moreover, there is a worldwide effort to make use of green sources of fuel, through first generation biomass (e.g. ethanol from fermentation of sugars) and second generation biomass (e.g. lignocellulosic). The second generation of biofuels of particular importance, as the fuel produced is not in direct competition with food. The catalytic conversion of syngas is currently a rapidly growing area in particular in the context of valorization of renewable and unconventional fossil resources. Syngas conversion is in the core of C1 chemistry. Many syngas-based catalytic processes correspond to industrial units such as GTL facilities in South Africa, Malaysia and Qatar, while others are at the stage of fundamental research. The talk summarizes new concepts in the design of catalysts and processes for selective syngas conversion to fuels and chemicals which involve supported nanoparticles of the VIII group metals, carbides and sulphides. The chemistry of the catalysts, their reactivity, stability, electronic, structural and nanosized effects relative to different surface species will be reviewed. Syngas conversion involves several multiphase and exothermic reactions. The specificity of syngas conversion to different products and process intensification will be discussed in terms of chemical kinetics, mass and heat transfer in chemical reactors.

Non-Skoltech attendees should request access to the building in advance by sending their passport details to energy.colloquium@skoltech.ru

Colloquium schedule and information on how to get to the colloquium can be found at <http://www.skoltech.ru/en/energy-colloquium/>