Biomass Conversion to Fuels and Value-Added Chemicals with Magnetically Recoverable Catalysts

Lyudmila M. Bronstein[1, 2, 3]

[1]Indiana University, Department of Chemistry, Bloomington, IN 47405, USA

[2]A.N. Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences, 28 Vavilov St., Moscow, 119991 Russia

[3]King Abdulaziz University, Faculty of Science, Department of Physics, Jeddah, 21589 Saudi Arabia

Biomass conversion plays a tremendous role in obtaining value-added chemicals and fuels from renewable sources without use of petrochemicals. In the last decade magnetically recoverable catalysts have received considerable attention due to more environmentally friendly processes, conservation of energy, and cheaper target products. In this talk I will discuss the use of magnetically recoverable catalysts for biomass and biooil related processes, including transformations of cellulose to value-added chemicals, syngas (produced by biooil pyrolysis) to methanol and methanol to hydrocarbons (fuels). It will be demonstrated that the presence of magnetic iron oxide nanoparticles can enhance catalytic activity or change the reaction mechanism, allowing for more valuable products. In some instances, however, the presence of iron oxide can be detrimental due to side reactions. In this case, a proper iron oxide nanoparticle stabilization is required to suppress side reactions.