Pyrolysis of Lignocellulosic Materials for the Production of Bio-fuels, Bio-chemicals and Bio-char.

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National energy security, climate change, the need to spur rural development and the clear economic advantages of converting organic wastes into valuable products are the main drivers for the renewed interest in replacing fossil fuels and chemicals with biomass based products. During the presentation the speaker will discuss some recent science and technology developments to implement a new model of biomass economy formed by distributed pyrolysis units and bio-oil rural or centralized refineries. Pyrolysis is certainly a very promising technology because it can convert up to 70 mass % of the biomass into crude bio-oils, of which at least 40 mass % can be further converted into green gasoline and green diesel via hydrotreatment. Furthermore, between 10 and 25 mass % of the biomass is converted into bio-char. Processing 75 % of the biomass available in the US via pyrolysis and bio-oil hydrotreatment could result in 273 million tons of green gasoline and green diesel annually, which represents 66 % of current US gasoline consumption (410 million tons/ annually). The use of bio-char as a soil amendment and carbon sequestration tool could make an important contribution to reduce global warming.

In spite of their great potential, fast pyrolysis and bio-oil hydrotreatment are susceptible of further improvements. For example, although pyrolysis is an excellent technology to produce second generation transportation fuels from lignin, existing technologies are not optimized to achieve high yields of precursors of transportation fuels from cellulose and hemicelluloses. During the presentation the speaker will discuss new concepts that under consideration for the production of drop in bio-fuels, bio-chemicals and bio-char from the pyrolysis of lignocellulosic materials.