

Haoxi Ben

haoxi.ben@ipst.gatech.edu, benhaoxi@gmail.com
(404)-538-1896

Objective

A prospective Ph.D. in chemistry is interested in working on thermal conversion of biomass and biomass component to biofuel and bio-chemicals.

Education

Georgia Institute of Technology, Atlanta, GA, U.S.

Jan 2009 – Dec 2012(expected)

Ph.D. in Chemistry

Current GPA: 3.80/4.00

Nanjing University, Nanjing, China

Aug 2003 – Jul 2007

B.S. in Chemistry

Research Experience

Georgia Institute of Technology, Atlanta, GA, U.S.

Jan 2009 – Present

Graduate Research Assistant

Thermal conversion of biomass and biomass components to biofuel and bio-chemicals

- Pyrolysis of softwood kraft lignin at different temperatures to find the optimal pyrolysis conditions and the possible pyrolysis pathway.
- Compare the pyrolysis products produced from different lignins and from different processes (fast pyrolysis vs. slow pyrolysis).
- Improve the properties of pyrolysis oils (reduce the acidity, molecular weight, viscosity, sulfur and oxygen content) by using different additives (zeolite and metal salts) during the pyrolysis.
- Fingerprint analysis of various pyrolysis oils (produced from cellulose, lignin, tannin, pine wood, bark and residue) by HSQC-NMR.
- Torrefaction of pine wood at various conditions to produce the bio-char with highest energy yield.
- Solid state NMR analysis of torrefied wood and other bio-chars (produced from cellulose, lignin, tannin, pine bark and residue) to propose the possible formation pathway.
- Further upgrading different pyrolysis oils to gasoline like aliphatic compounds by hydrogen deoxygenation in aqueous phase with noble metal.
- Aging test and cold flow properties (cloud point and pour point) analysis of pyrolysis oils and upgraded pyrolysis oils.

Publications

1. **Ben, H.**; Ragauskas, A., NMR characterization of pyrolysis oils from Kraft lignin. *Energy & Fuels* **2011**, 25, 2322-2332.
2. **Ben, H.**; Ragauskas, A., Pyrolysis of softwood Kraft lignin with additives. *Energy & Fuels* **2011**, 25, 4662-4668.
3. Kosa, M.; **Ben, H.**; Theliander, H.; Ragauskas, A., Pyrolysis oils from CO₂ precipitated Kraft lignin. *Green Chemistry* **2011**, 13, 3196-3202. (*Kosa, M and Ben, H. Contributed equally to this work*)
4. **Ben, H.**; Ragauskas, A., Torrefaction of Loblolly pine. *Green Chemistry* **2012**, 14, 72-76.

5. **Ben, H.**; Ragauskas, A., Heteronuclear Single-Quantum Correlation–Nuclear Magnetic Resonance (HSQC–NMR) fingerprint analysis of pyrolysis oils, *Energy & Fuels* **2011**, 25, 5791-5801.
6. David, K.; **Ben, H.**; Muzzy, J.; Ragauskas, A., Chemical characterization and water content determination of bio-oils obtained from various biomass species using ^{31}P -NMR spectroscopy, *accepted by Biofuels*.
7. **Ben, H.**; Pan, S.; Berg, A.; Ragauskas, A., In depth analysis of pyrolysis oils produced from tannin, pine bark and residue. Will submit to *Energy & Environmental Science*.
8. **Ben, H.**; Mu, W.; Deng, Y.; Ragauskas, A., Production of renewable gasoline from aqueous phase hydrogenation of lignin pyrolysis oil. Will submit to *Energy & Environmental Science*.
9. **Ben, H.**; Ragauskas, A., In situ NMR characterization of pyrolysis oil during the accelerated aging process, Will submit to *Petroleum & Environmental Biotechnology*.
10. **Ben, H.**; Lu, D.; Bian, N.; Wu, M., Studies on the chemical constituents of cucumber, *Natural Product Research & Development* **2008**, 20 (3), 388-394.

Presentations and Posters

1. **Ben, H.**; Ragauskas, A., Georgia life sciences summit 2010, Poster section.
2. **Ben, H.**; Ragauskas, A., International Bioenergy and Bioproducts Conference 2011, Presentation by Ben, H.

Laboratory Skills

Pyrolysis (fast and slow) and torrefaction process of biomass and biomass components.

Hydrogen deoxygenation process of pyrolysis oils. (Parr reactor)

NMR techniques, including ^{31}P NMR, ^{13}C NMR, ^1H NMR, HSQC, DEPT and solid state NMR.

Analytical chromatography, including GC-MS, HPLC, GPC and high performance anion exchange chromatography with pulsed amperometric detection (HPAEC–PAD).