Pyrolysis of lignin–Novel Way of Producing Biofuels

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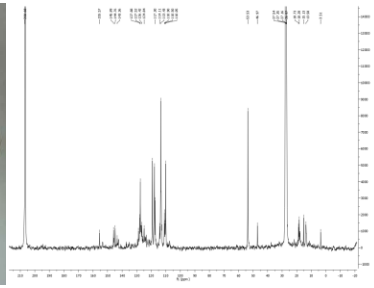
PROGRAM DESCRIPTION

- The development of inexpensive renewable alternatives transportation fuels
- Lignin is the second most abundant biopolymer on Earth With a 20 x 10^9 annual biosynthesis rate
- Lignin is an abundant bioresource available from:
  - Currently from Chemical Pulp Mills
  - Shortly from Cellulosic Ethanol Biorefineries
- Typical kraft pulp mill utilizes about 650,000 tons of wood/year generating approximately 200,000 tons of lignin/year

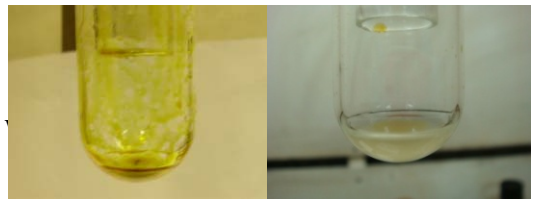
TECHNICAL DETAILS

- Pyrolysis of lignin at different temperature from 300°C to 600 °C
- Use different types of zeolites as catalyst
- Use NMR, GC, GC-MS, GPC and elemental analysis to analyze the pyrolysis oil



PAYOFF

- Pyrolysis oil from lignin is a potential green diesel or biogasoline bioresource
- Enhanced pyrolysis oil production
- Improved pyrolysis oil properties



KEY ACCOMPLISHMENTS

- Optimized pyrolysis conditions without catalyst: 500 °C the yield is 43%
- The optimized condition of pyrolysis with zeolites as catalyst is using powder zeolites at 500 °C the yield is 70%.

Without catalyst at 500 °C for different times

500°C	Oil/%	Char/%
60 min	43.20	54.41
30 min	35.79	53.03
15 min	32.57	51.91

with catalyst at different temperatures

	Oil/%	Char/%
600 °C	33.21	41.87
500 °C[1]	51.17	33.68
500 °C[2]	70.32	10.20
400 °C	32.86	46.61
300 °C	16.68	76.49

Professor AJ Ragauskas, Supervisor