

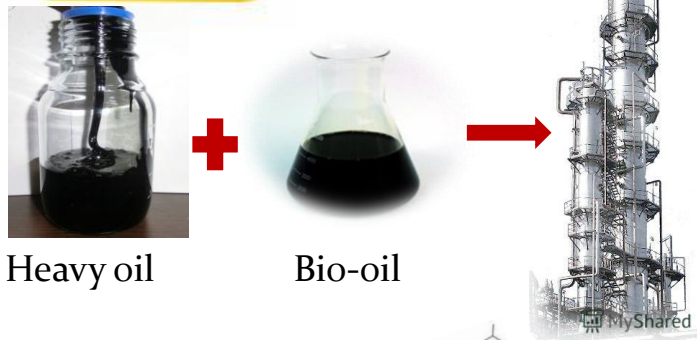


# BIOMASS AND OILS CO-HYDROPROCESSING IN SUPERCRITICAL CONDITIONS



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Heavy oil

Bio-oil

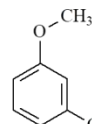
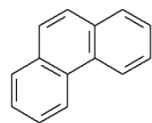
Catalysts

Ru-Co-SiO<sub>2</sub>-MN-270

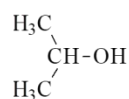
Ru-Ni-SiO<sub>2</sub>-MN-270



Substrates:  
✓ Anthracene  
✓ Guaiacol



Solvents:  
✓ hexane  
✓ Propanol-2



Conditions

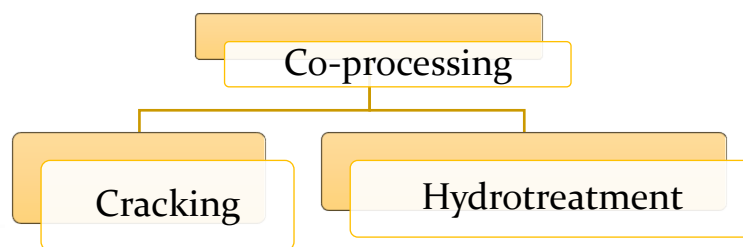
Temperature – 270 °C,  
Nitrogen pressure – 3.0 MPa  
Total pressure – 7.5 -9.5 MPa  
Catalyst weight – 0.1 g  
Substrate concentration – 33.33 g/L



Parr Series 5000 Multiple Reactor System

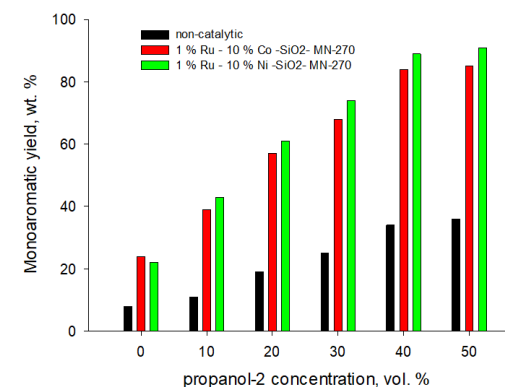
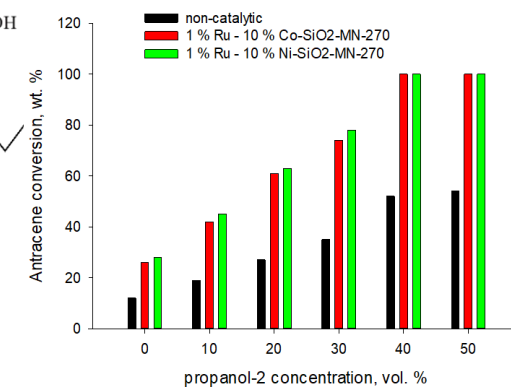
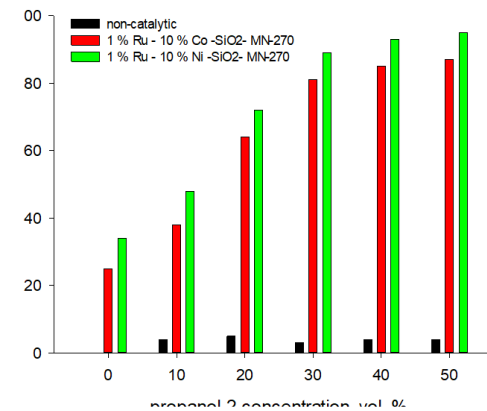
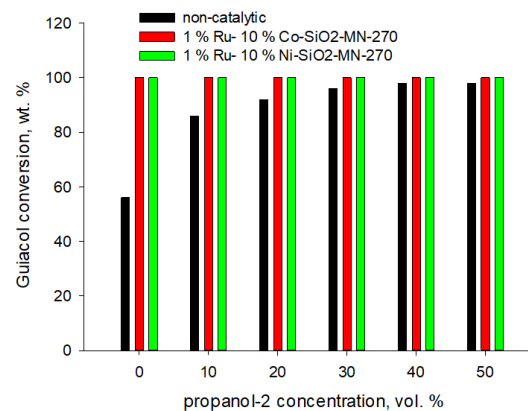
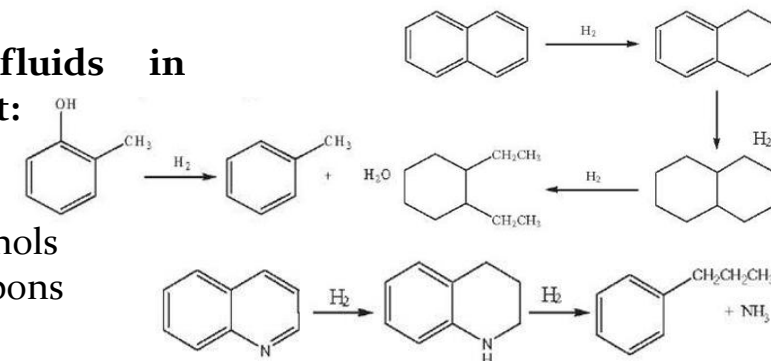


GC-2010 gas chromatograph  
GCMS-QP2010S mass-spectrometer



Supercritical fluids in hydrotreatment:

- Water
- Tetralin
- Secondary alcohols
- Light hydrocarbons



Guaiacol content, wt. %	Conversion, wt. %	C <sub>6</sub> hydrocarbon yield, wt. %
5	100	90
15	100	93
30	100	97
50	100	98

- The addition of guaiacol to anthracene increases the C<sub>6</sub> hydrocarbon yield up to 98 wt. %
- The synergetic effect of C-C and C-O bonds breaking during the process is observed.
- Benzene and cyclohexane were found to be main product