

Supplementary information:

Table S1 Proximate and elemental analyses of Douglas fir sawdust pellets

Characteristics	Douglas fir sawdust pellets
<i>Proximate analysis (wt%)</i>	
Moisture	4.82
Volatile matter	76.08
Fixed carbon	18.89
Ash	0.21
<i>Elemental analysis (wt%)</i>	
Carbon	47.90
Hydrogen	6.55
Nitrogen	0.08
Oxygen	45.57

Table S2 Proximate and elemental analyses of char

Characteristics	Char
<i>Proximate analysis (wt%)</i>	
Moisture	6.63
Ash	11.86
<i>Elemental analysis (wt%)</i>	
Carbon	81.47
Hydrogen	0.72
Nitrogen	0.69
Oxygen	4.38

Table S3 CHN and TOC analysis of mixed bio-oils from catalytic microwave pyrolysis

Characteristics	Mixed bio-oils
Carbon	78.60
Hydrogen	8.72
Nitrogen	0.02
Oxygen	6.22

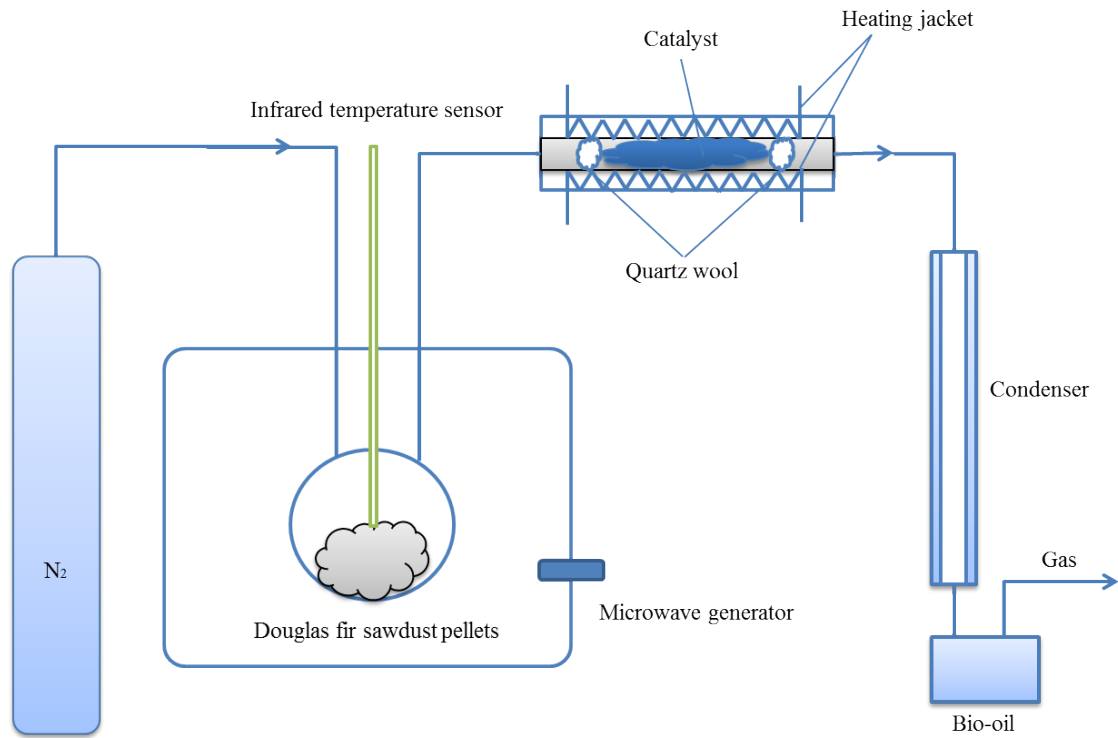


Fig. S1 The schematic diagram of the microwave-assisted pyrolysis system integrated with catalysis process

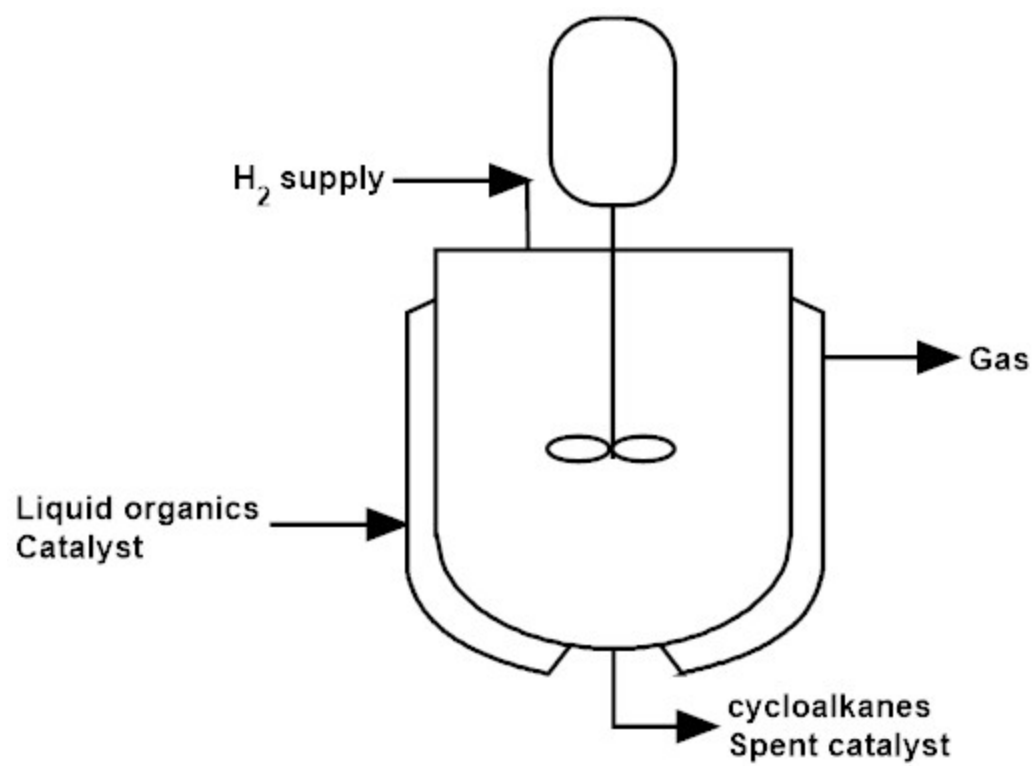


Fig. S2 The schematic overview of the hydrogenation process set-up