Electronic Supplementary Material (ESI) for Reaction Chemistry & Engineering.

Supplementary Data

Evaluation of Pressure and Temperature Effects on Hydropyrolysis of Pine Sawdust: Pyrolysate Composition and Kinetics Studies

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Figure S1. Pressure transducer for Py-GC/MS setup.

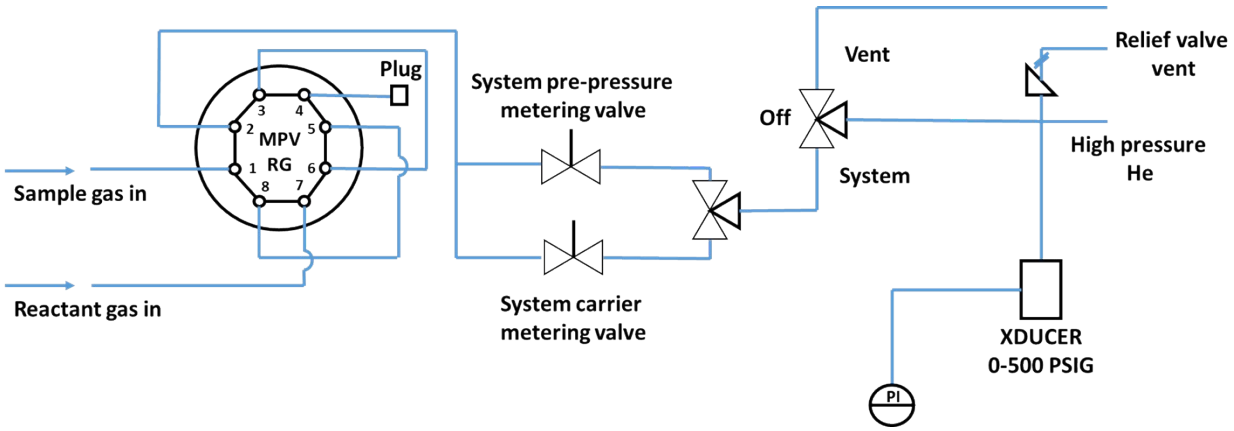

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Figure S2. Flow diagram of Position 1, SAMPLING mode of Pyroprobe®. Red line denotes path of pyrolysates from Pyroprobe® to trap (*redrawn from CDS 5200 Pyroprobe® manual*).

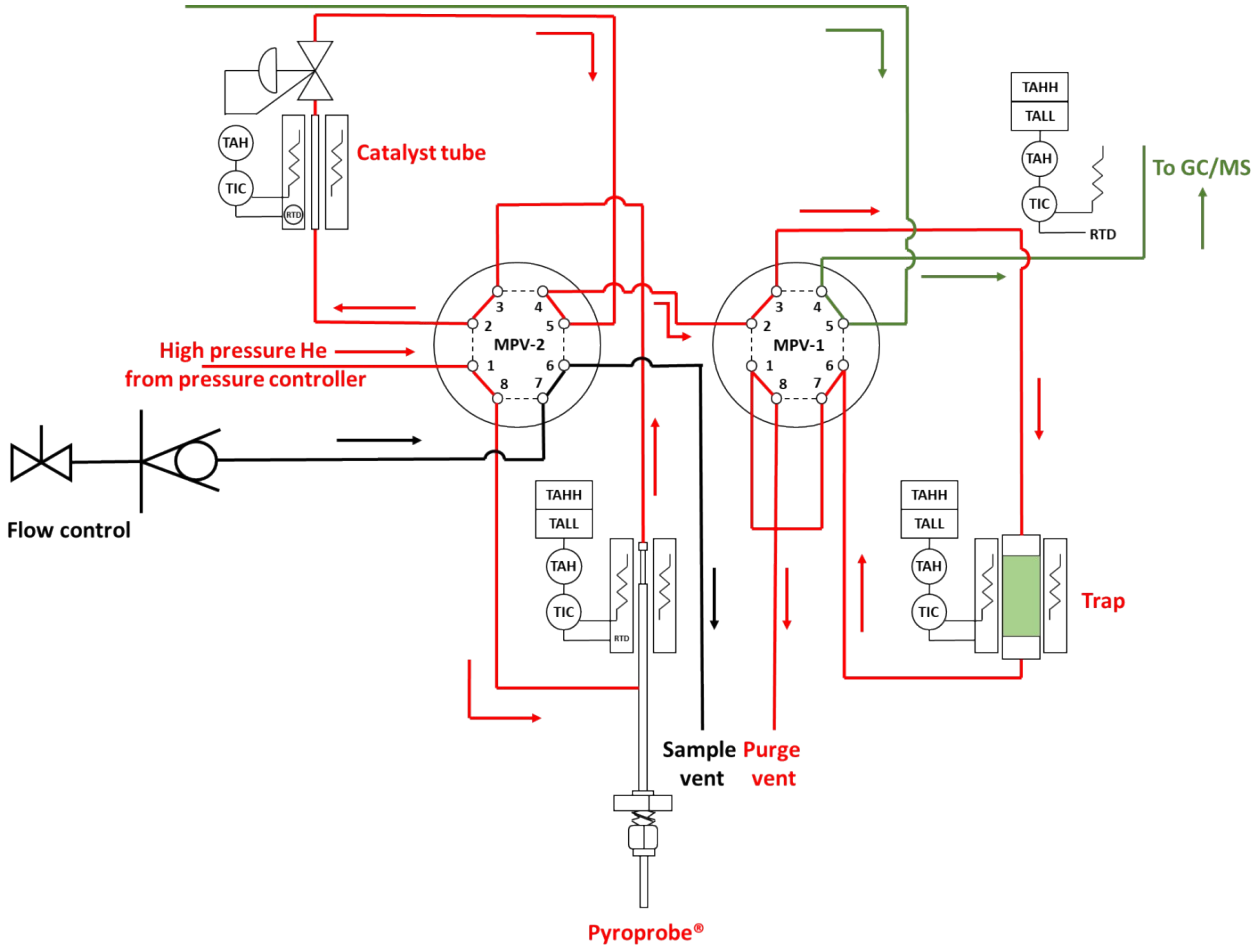

Figure S3. Flow diagram of Position 2, RUN mode of Pyroprobe®. Red line denotes the path of desorbed pyrolysates from trap to GC/MS (*redrawn from CDS 5200 Pyroprobe® manual*).

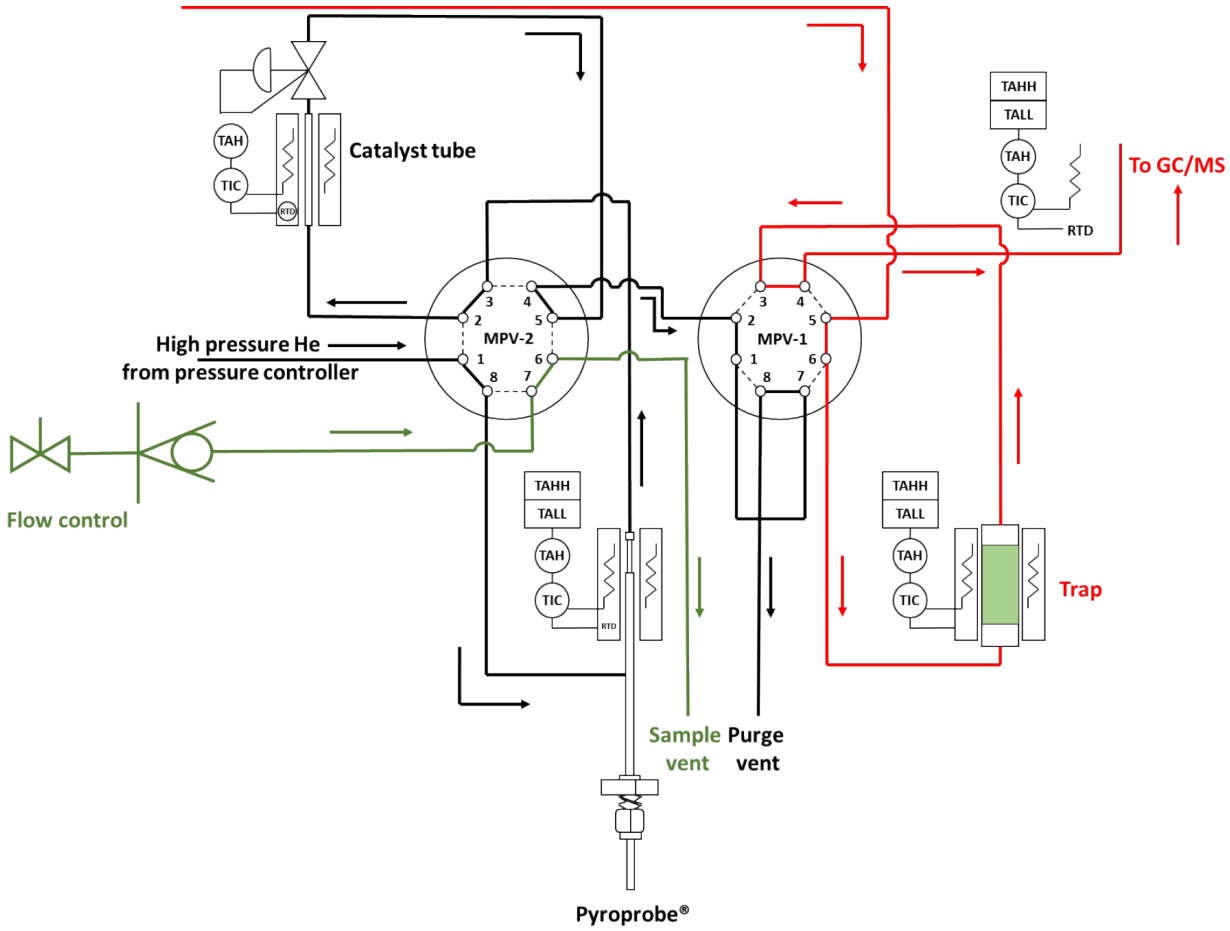

Figure S4. Schematic of Py-FTIR set-up for high pressure hydropyrolysis. Pressure regulation is done through back pressure regulator.

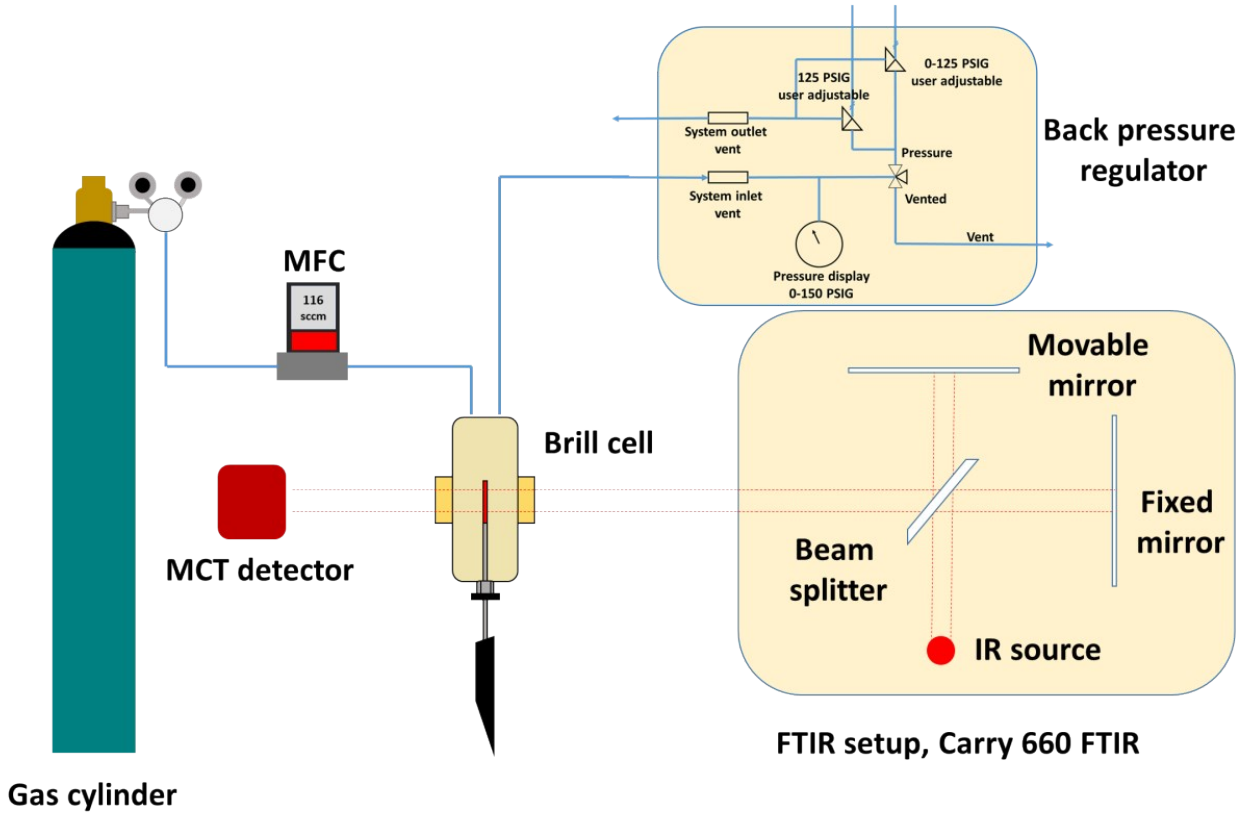

Figure S5. Effect of pressure on the yields of pyrolysates (absolute area/µg of pine) and char (wt.%) at 400 °C in helium ambience.

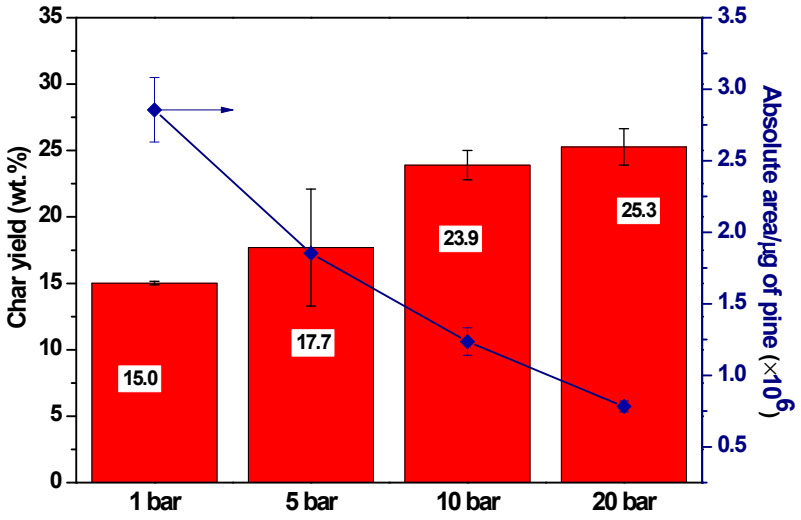

Figure S6. Effect of hydrogen partial pressure on the yields of pyrolysates (absolute area/µg of pine) and char (wt.%) at 400 °C in hydrogen ambience.

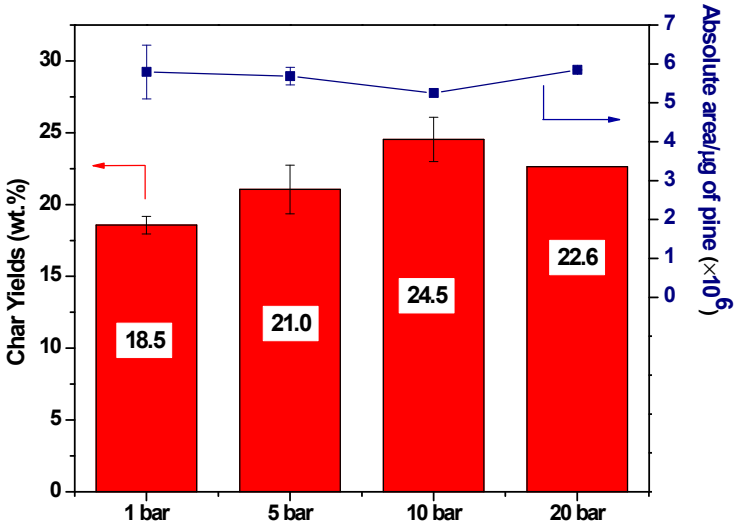

Figure S7. Effect of catalyst tube material on product composition at 1 bar and 400 °C in helium ambience.

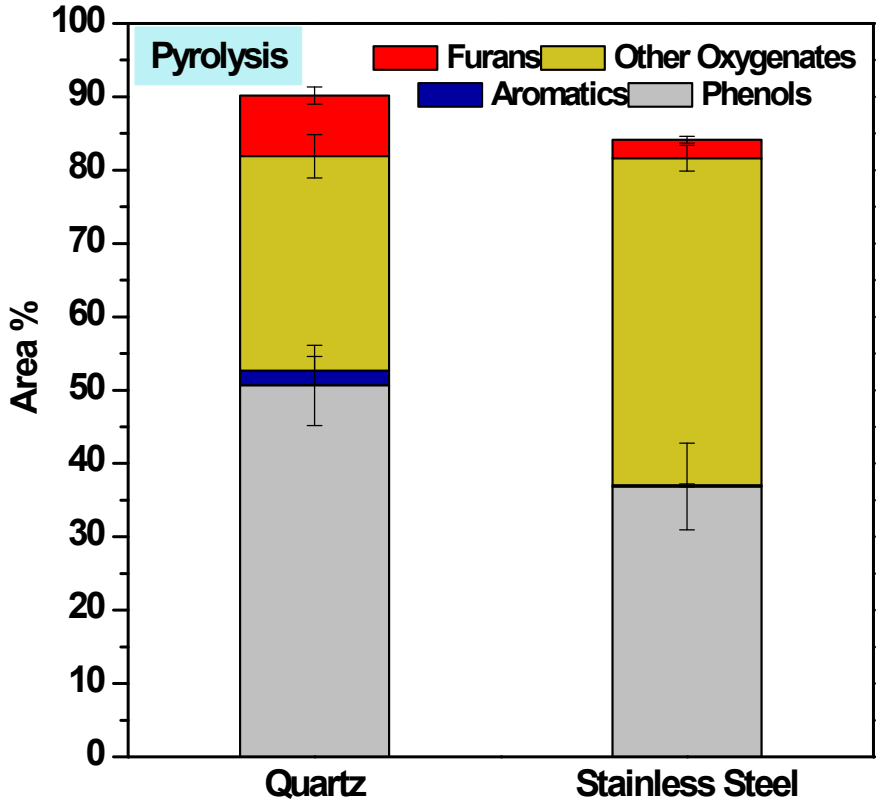

Figure S8. g(α) vs time plots for different conditions according to 3D-diffusion model.

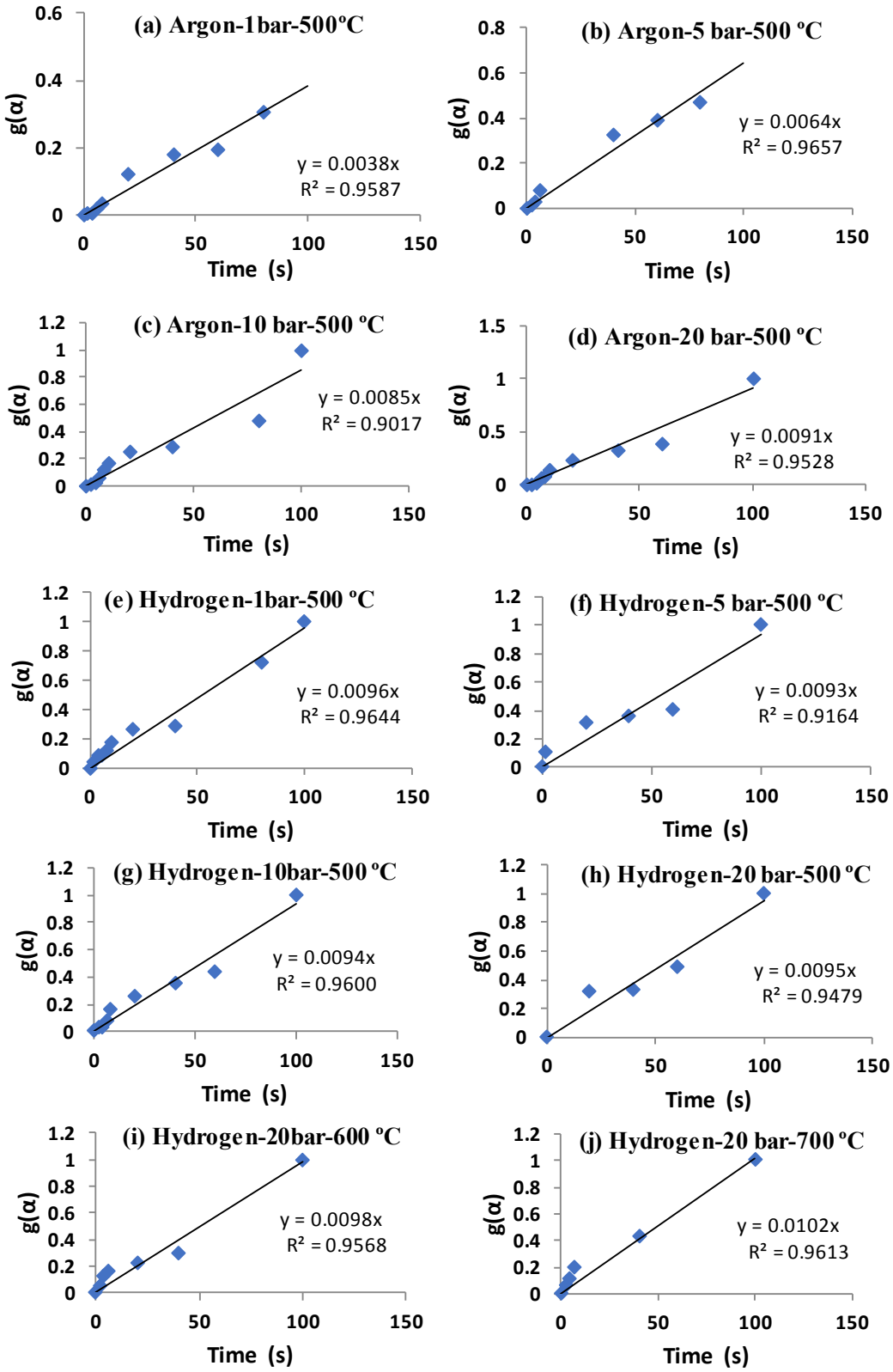

Table S1. Absorbance of salient peaks at 1, 5, and 15 bar partial pressures of inert Ar and reactive H_2 from Py-FTIR experiments.

Pressure	Peak	Ar		H_2	
		500°C	700°C	500°C	700°C
1 bar	CO_2	0.068	0.080	0.095	0.104
	Carbonyl	0.154	0.188	0.204	0.235
	CH_4	0.015	0.034	0.036	0.040
	Methoxy	0.043	0.065	0.068	0.067
	CO	0.011	0.021	0.013	0.024
	H_2O	0.014	0.020	0.040	0.013
5 bar	CO_2	0.158	0.309	0.336	0.320
	Carbonyl	0.112	0.221	0.242	0.211
	CH_4	0.011	0.053	0.036	0.079
	Methoxy	0.025	0.053	0.058	0.059
	CO	0.011	0.034	0.026	0.055
	H_2O	0.063	0.036	0.04	0.035
15 bar	CO_2	0.355	0.459	0.591	0.593
	Carbonyl	0.179	0.189	0.229	0.220
	CH_4	0.065	0.094	0.048	0.132
	Methoxy	0.075	0.089	0.049	0.063
	CO	0.061	0.074	0.041	0.094
	H_2O	0.099	0.11	0.082	0.098