Supplementary Material

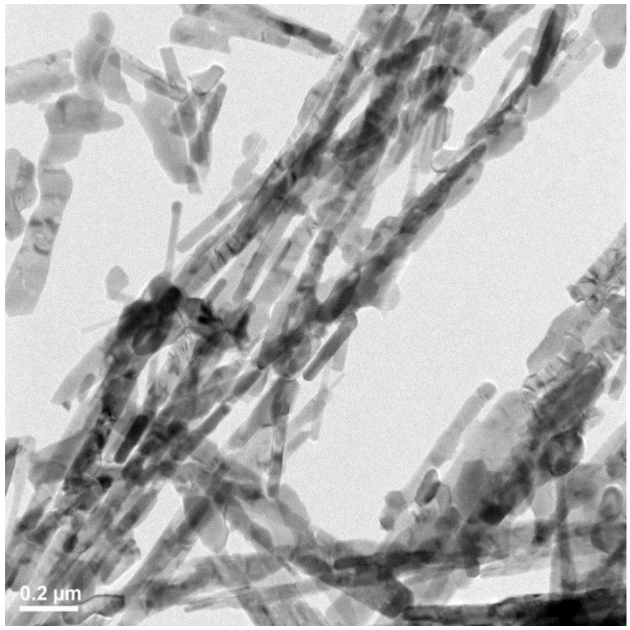

Figure S1a. TEM image of anatase TiO_2 nanorods

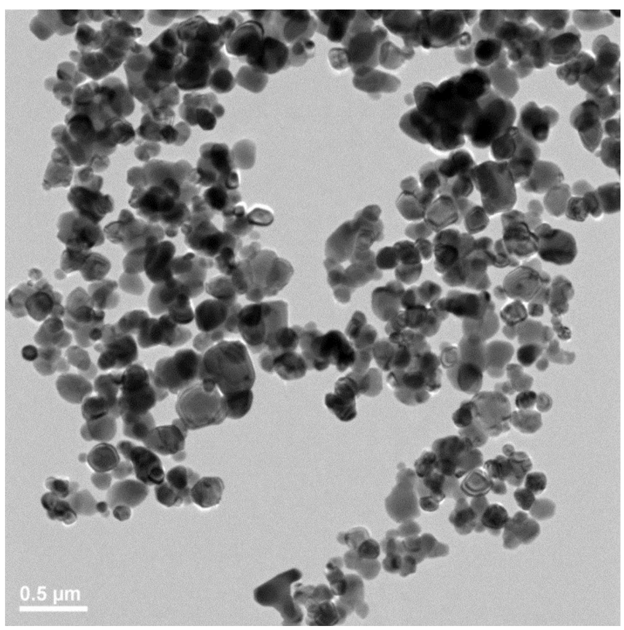

Figure S1b. TEM image of commercial anatase TiO_2 nanopowder

Table S1. Physicochemical Properties of Sugar Maple

Physicochemical Properties	Sugar Maple Feedstock
Proximate analysis (wt.% dry basis)	
Volatile Matter	85.56
Fixed Carbon	13.63
Ash	0.81
Ultimate analysis (wt.% dry basis)	
Carbon	48.91
Hydrogen	5.87
Nitrogen	< 0.5
Sulfur	<0.05
Chlorine	69ppm
Oxygen (by difference)	44.39
Compositional analysis (wt.% dry basis)	
Glucan	39.44
Xylan	15.91
Acetyl	3.76
Arabinan	0.23
Mannan	2.27
Total Lignin	26.33
Water Extractable others	3.63
Ethanol Extractives	1.27

Table S2:.Summary of the carbon yields of the primary monofunctional species obtained after reacting biomass pyrolysis vapors over various TiO_2 nanorods; reaction conditions: temperature (550 ^{o}C), and catalyst-to-feed ratio (8 w/w).

Catalysts	*Blank*	*TiO_2 nanorods*	*1 wt% Ni/TiO_2 nanorods*	*5 wt% Ni/TiO_2 nanorods*	*1 wt% Pt/TiO_2 nanorods*	*5 wt% Pt/TiO_2 nanorods*
Monofunctional molecules						
Linear ketones						
Acetone	BDL	1.82	1.0	0.67	1.08	1.42
2-Butanone	BDL	1.37	BDL	BDL	2.38	2.90
2-Pentanone	BDL	0.07	BDL	BDL	0.09	0.44
3-Pentanone	BDL	BDL	BDL	BDL	0.41	BDL
3-Penten-2-one	BDL	BDL	BDL	BDL	BDL	BDL
C6/C7 ketones	BDL	BDL	BDL	BDL	0.04	1.06
Cyclic ketones						
2-Cyclopenten-1-one(s)	BDL	3.22	1.21	3.25	2.02	2.63
Cyclopentanone	BDL	0.60	BDL	0.61	BDL	0.33
Other useful monofunctional species						
Methanol	BDL	0.97	0.94	0.73	0.65	0.62
Acetaldehyde	BDL	1.53	1.51	0.99	0.55	0.79
Furan(s)	BDL	0.70	0.51	0.36	1.38	2.11
Simple phenols	BDL	0.50	0.26	0.68	0.42	0.63
Effect on selected primary pyrolysis oxygenates						
Hydroxyacetaldehyde	9.61	0.34	1.36	1.38	0.16	0.29
Acetic acid	4.16	4.85	5.02	5.10	3.71	4.41
Levoglucosan	4.04	0.64	1.95	0.55	0.74	0.72
Hydroxyacetone	1.22	0.75	0.82	1.30	0.10	0.34
Methyl pyruvate	0.70	0.01	0.16	0.30	0.11	0.15
Furfural	0.55	0.78	0.83	0.88	0.16	0.34
5-Hydroxymethyl furfural	0.42	0.02	0.01	0.22	0.01	0.02
2(5H)-Furanone	0.36	0.06	0.06	0.07	0.04	0.06
2-Furanmethanol	0.06	0.06	0.11	0.16	0.01	0.13
2-Furancarboxaldehyde, 5-methyl-	0.02	0.03	0.02	0.01	0.02	0.02

BDL=below detection limit

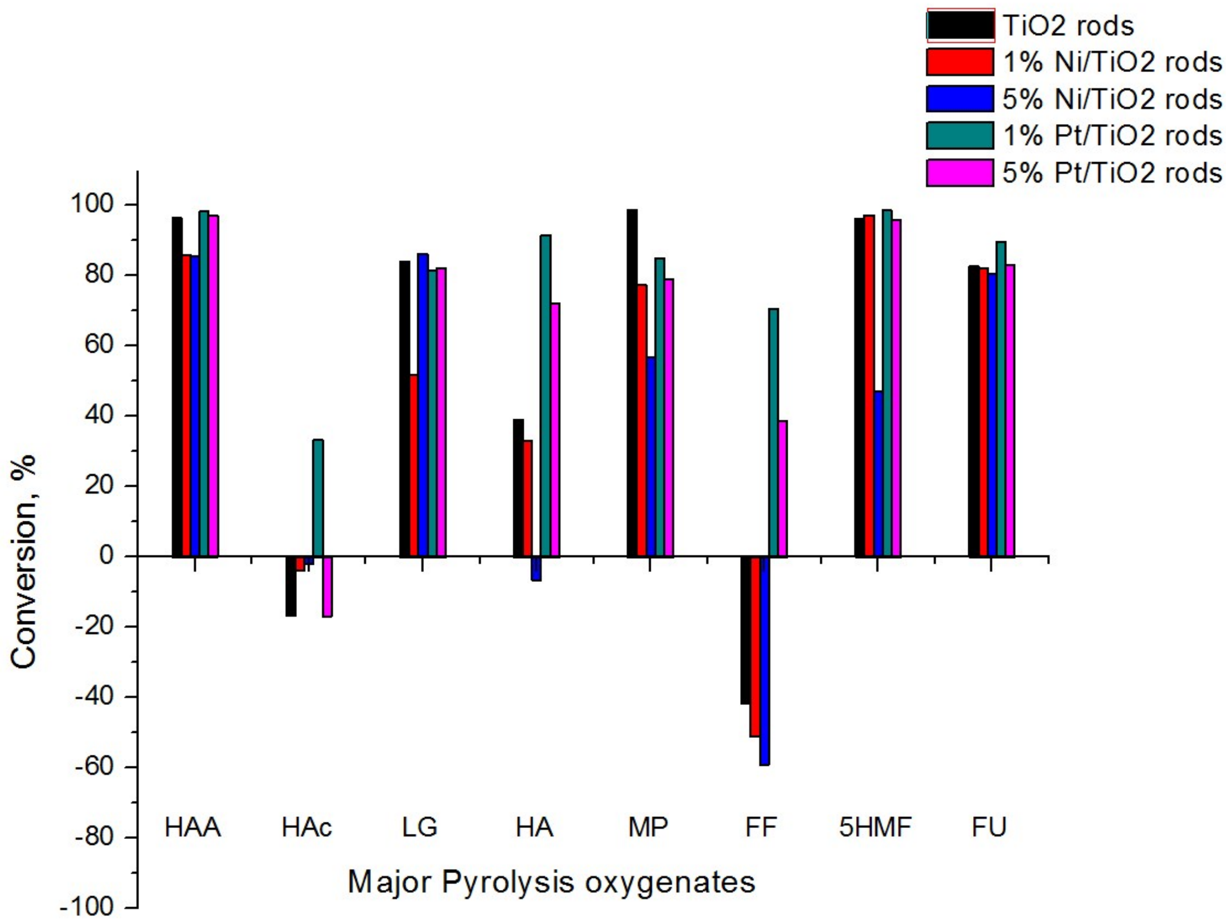

Figure S2. Conversion chart of selected pyrolysis oxygenated species over anatase TiO_2 nanorods. The negative conversion values mean the yields of oxygenates increased after the catalytic reaction.

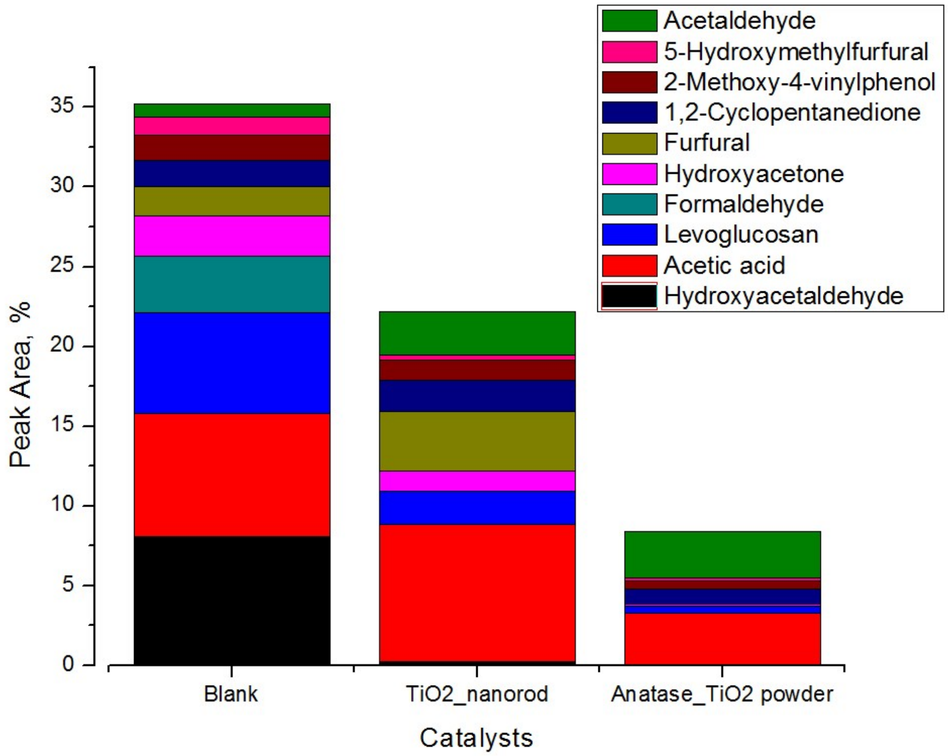

Figure S2. Relative intensity of selected pyrolysis oxygenated species after reaction over anatase TiO_2 nanorods and TiO_2 nanopowder.

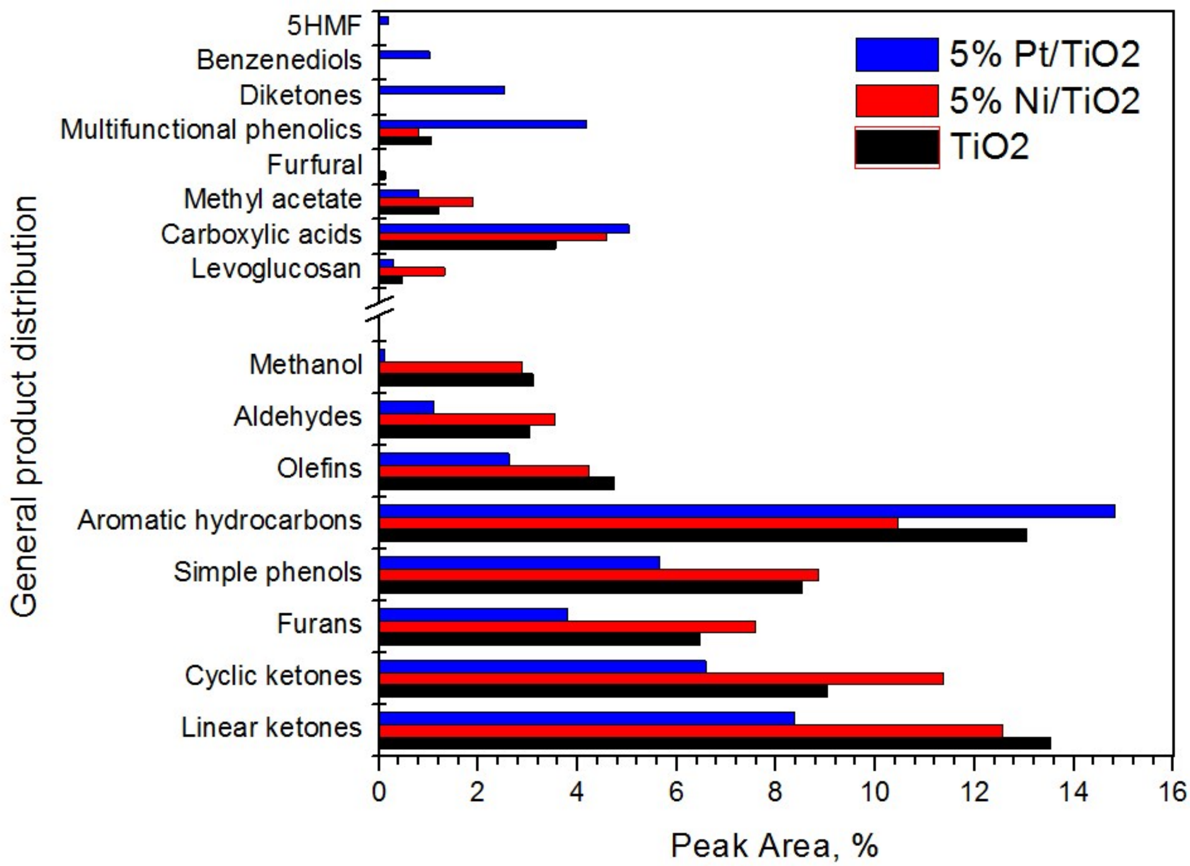

Figure S4. Chart showing the effect of impregnating 5wt% of Ni and Pt metals on anatase TiO_2 nanopowder in terms of the conversion of pyrolysis oxygenates and the distribution of key reaction products

Table S3:.Summary of the carbon yields of the primary monofunctional species obtained after reacting biomass pyrolysis vapors over various TiO_2 nanorods; reaction conditions: temperature (550 ^oC), and catalyst-to-feed ratio (8 w/w)

Catalysts	*Blank*	*CaO/CeO$_2$*	*ZrO$_2$*	*MgO*	*Rutile TiO$_2$*
Monofunctional molecules					
Linear ketones					
Acetone	BDL	4.52	2.27	1.03	0.68
2-Butanone	BDL	3.5	0.76	2.07	1.57
2-Pentanone	BDL	0.86	0.03	0.11	BDL
3-Pentanone	BDL	1.67	BDL	BDL	BDL
3-Penten-2-one	BDL	BDL	BDL	BDL	BDL
C6/C7 ketones	BDL	1.30	BDL	BDL	BDL
Cyclic ketones					
2-Cyclopenten-1-one(s)	BDL	3.71	0.28	1.04	0.80
Cyclopentanone	BDL	0.79	0.03	0.37	0.09
Other useful monofunctional species					
Methanol	BDL	0.87	BDL	0.76	0.45
Acetaldehyde	BDL	0.37	0.39	1.26	1.26
Furan(s)	BDL	0.69	1.11	0.69	0.72
Simple phenols	BDL	1.31	0.56	0.26	0.43
Effect on selected primary pyrolysis oxygenates					
Hydroxyacetaldehyde	9.61	BDL	3.03	0.63	1.31
Acetic acid	4.16	BDL	3.33	2.96	4.33
Levoglucosan	4.04	BDL	0.38	0.40	0.24
Hydroxyacetone	1.22	BDL	1.05	1.16	0.72
Methyl pyruvate	0.70	BDL	0.68	0.06	0.60
Furfural	0.55	BDL	0.64	BDL	1.08
5-Hydroxymethyl furfural	0.42	BDL	0.46	0.14	0.29
2(5H)-Furanone	0.36	BDL	0.04	0.06	0.05
2-Furanmethanol	0.06	BDL	0.09	0.01	0.15
2-Furancarboxaldehyde, 5-methyl-	0.02	0.04	BDL	0.01	0.20