Additional Materials

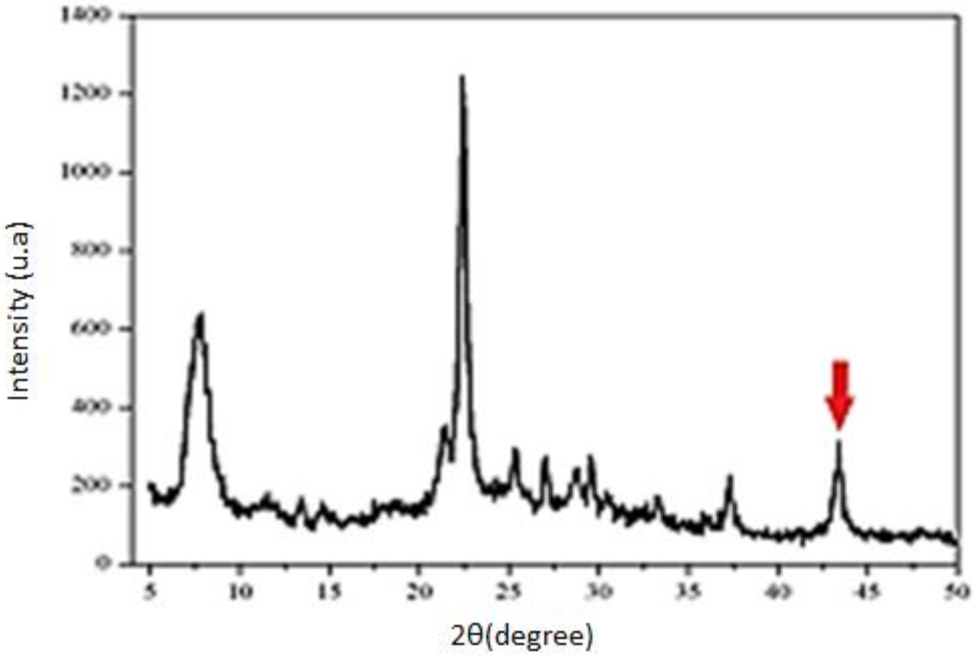

Figure S1 X-ray diffractogram of zeolite beta impregnated with 5% nickel.

Table S1 Silicon, aluminum and nickel contents and specific surface areas and porosity of the catalysts. B = beta zeolite; B3Ni = beta zeolite impregnated with 3% nickel and B5Ni = beta zeolite impregnated with 3% nickel and SU = grape residues without catalyst.

	B	B3Ni	B5Ni	SU
Silicon content (%)	37.8	39.8	35.3	-
Aluminum content (%)	2.85	2.53	2.22	-
Si/Al ratio	13	15	15	-
Nickel content (%)	-	3.56	6.83	
Sg (m^2/g)	459	500	487	-
Vmicro (t-plot) (cm^3/g)	0.12	0.16	0.15	-
Vmeso (BJH) (cm^3/g)	0.24	0.21	0.18	-
D (BJH) (nm)	6.6	7.9	7.8	-

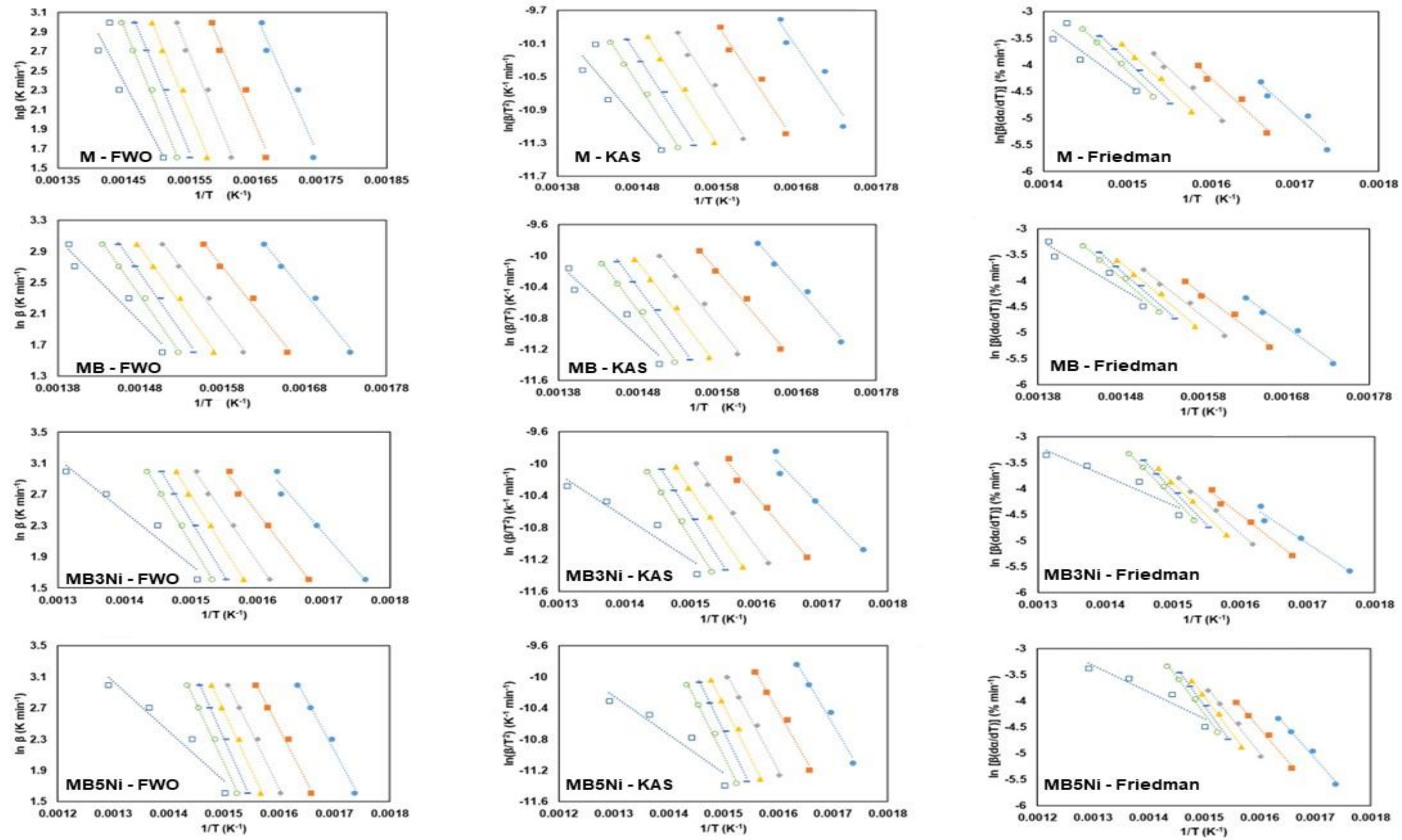

Figure S2 Kinetic curves at different conversion degrees for FWO, KAS and Friedman methods for MDF catalytic and non-catalytic pyrolysis. The lines presented are associated to conversion fraction (a): (-)0.2; (-)0.3; (-)0.4; (-)0.5; (-)0.6; (-)0.7 and (-)0.8.

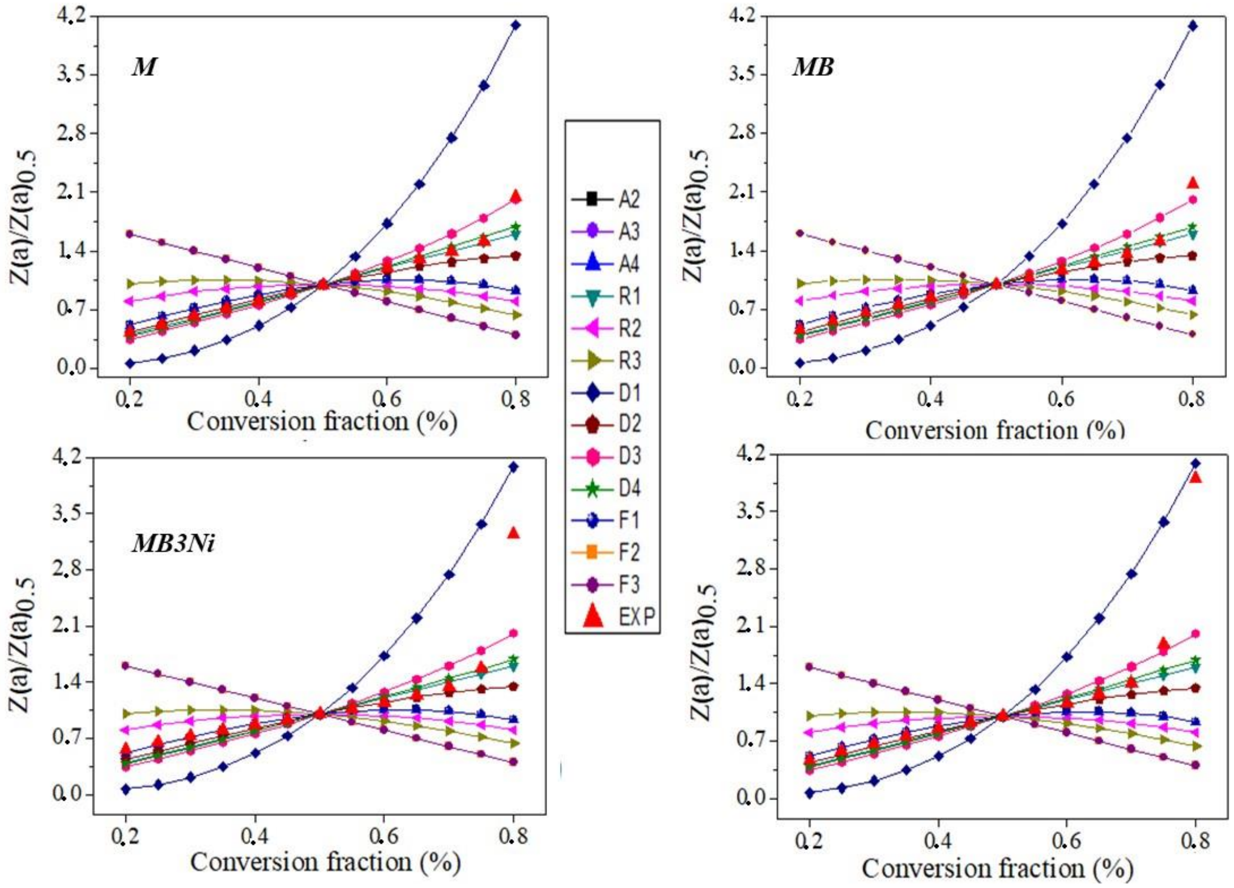

Figure S3 Master curves and experimental data obtained using the Criado method for M, MB, MB3Ni and MB5Ni.

Table S2 Pre-exponential factor (A) for MDF pyrolysis over the catalysts calculated by Friedman (F), Kissinger-Akira-Sunose (KAS) and Flynn-Wall-Ozawa (FWO) isoconversional methods. The results were presented in $\log_{10}$ to facilitate data manipulation.

Log$_{10}$ Pre-exponential factor (Log$_{10}$ A) – s^{-1}						
α	**M**			**MB**		
	FWO	**KAS**	**Friedman**	**FWO**	**KAS**	**Friedman**
0.2	12.71	6.29	8.19	9.95	3.37	5.68
0.3	12.67	6.24	8.13	10.15	3.57	5.93
0.4	12.75	6.31	8.22	10.54	3.96	6.33
0.5	12.65	6.20	8.11	11.04	4.49	6.86
0.6	12.52	6.06	7.99	11.33	4.79	7.19
0.7	12.51	6.03	7.96	11.33	4.77	7.21
0.8	10.19	3.47	5.54	8.72	1.83	4.48
	MB3Ni			**MB5Ni**		
	FWO	**KAS**	**Friedman**	**FWO**	**KAS**	**Friedman**
0.2	7.76	0.93	3.54	10.20	3.64	5.95
0.3	8.75	1.99	4.59	10.44	3.87	6.21

0.4	9.59	2.90	5.49	10.88	4.33	6.69
0.5	10.36	3.75	6.33	11.46	4.95	7.31
0.6	10.82	4.23	6.83	11.79	5.30	7.67
0.7	10.84	4.23	6.85	11.50	4.97	7.39
0.8	6.39	-0.96	2.00	6.13	-1.30	1.64

Table S3 Thermodynamic parameters for evaluated catalytic and non-catalytic systems for each conversion fraction studied.

Thermodynamic parameters						
α	**M**			**MB**		
	ΔG	**ΔH**	**ΔS**	**ΔG**	**ΔH**	**ΔS**
0.2	179.25	110.79	-0.10	192.42	90.84	-0.15
0.3	181.43	117.80	-0.10	191.00	92.62	-0.15
0.4	181.94	119.39	-0.09	187.52	94.27	-0.14
0.5	185.28	121.36	-0.10	182.87	96.47	-0.13
0.6	188.77	123.38	-0.10	181.60	99.40	-0.12
0.7	189.58	123.77	-0.10	184.71	102.73	-0.12
0.8	220.58	124.03	-0.15	222.90	105.78	-0.17
	MB3Ni			**MB5Ni**		
	ΔG	**ΔH**	**ΔS**	**ΔG**	**ΔH**	**ΔS**
0.2	195.45	71.86	-0.18	191.85	99.23	-0.14
0.3	188.36	78.31	-0.16	192.39	103.20	-0.13
0.4	182.11	83.65	-0.15	192.54	109.46	-0.12
0.5	176.42	88.73	-0.13	192.07	117.04	-0.11
0.6	175.64	94.40	-0.12	191.41	120.92	-0.10
0.7	180.80	99.76	-0.12	190.81	116.80	-0.11
0.8	247.76	104.33	-0.21	190.33	42.36	-0.22