

## Supplementary Material

### Experimental RCM New Data

Gasoline type experiments, phi=1								
test#	P_initial(torr)	T_initial(deg C)	Diluent	P_EOC(bar)	T_EOC(K)	1st_ign	total_ign	reactive
1	560	85	Nitrogen_25%/CO2 75%	19.49	668.50	3.09	15.91	1
2	560	85	Nitrogen_25%/CO2 75%	19.41	668.00	5.62	15.48	1
3	560	85	Nitrogen_25%/CO2 75%	19.41	668.05	5.85	15.76	1
4	560	85	Nitrogen_25%/CO2 75%					0
5	560	100	Nitrogen_25%/CO2 75%	19.22	689.70	4.51	15.03	1
6	560	100	Nitrogen_25%/CO2 75%	19.22	689.70	4.59	14.75	1
7	560	100	Nitrogen_25%/CO2 75%	19.22	689.70	4.53	14.91	1
8	560	100	Nitrogen_25%/CO2 75%					0
9	513	85	Nitrogen_70%/CO2 30%	19.42	732.20	1.56	15.82	1
10	511	85	Nitrogen_70%/CO2 30%	19.39	732.50	1.16	15.58	1
11	512	85	Nitrogen_70%/CO2 30%	19.56	733.50	1.71	15.39	1
12	512	85	Nitrogen_70%/CO2 30%					0
13	512	100	Nitrogen_70%/CO2 30%	19.36	757.55		18.36	1
14	512	100	Nitrogen_70%/CO2 30%	19.32	757.25		17.87	1
15	512	100	Nitrogen_70%/CO2 30%	19.35	757.50		17.95	1
16	512	100	Nitrogen_70%/CO2 30%					0
17	512	125	Nitrogen_70%/CO2 30%	18.95	796.50		18.86	1
18	520	125	Nitrogen_70%/CO2 30%	19.40	797.65		17.16	1
19	520	125	Nitrogen_70%/CO2 30%	19.37	797.40		18.13	1
20	520	125	Nitrogen_70%/CO2 30%					0
21	434	90	Nitrogen_75%/Argo	18.64	843.00		8.80	1

			n_25%					
22	450	90	Nitrogen_75%/Argon_25%	19.50	844.70		9.57	1
23	450	90	Nitrogen_75%/Argon_25%	19.56	845.25		8.65	1
24	453	90	Nitrogen_75%/Argon_25%					0
25	450	105	Nitrogen_75%/Argon_25%	19.16	870.65		6.37	1
26	450	105	Nitrogen_75%/Argon_25%	19.20	871.05		5.64	1
27	450	105	Nitrogen_75%/Argon_25%	19.31	872.10		6.04	1
28	450	105	Nitrogen_75%/Argon_25%					0
29	585	85	CO2_100%	19.61	642.20	10.19	22.84	1
30	585	85	CO2_100%	19.70	642.65	9.83	21.77	1
31	585	85	CO2_100%	19.74	642.90	9.85	22.04	1
32	585	85	CO2_100%					0
33	1170	100	CO2_100%	38.21	661.15	3.61	7.96	1
34	1178	100	CO2_100%	38.79	662.05	4.09	7.74	1
35	1180	100	CO2_100%	39.16	662.85	4.09	7.52	1
36	1180	100	CO2_100%					0
37	1180	115	CO2_100%	38.85	683.70	1.82	5.97	1
38	1180	115	CO2_100%	39.08	684.35	1.40	5.74	1
39	1180	115	CO2_100%	38.65	683.10	2.62	5.91	1
40	1180	115	CO2_100%					0
41	1137	110	Nitrogen_30%/CO2_70%	40.49	714.65		3.86	1
42	1130	110	Nitrogen_30%/CO2_70%	40.40	715.15		3.97	1
43	1134	110	Nitrogen_30%/CO2_70%	40.81	715.95		3.89	1
44	1130	110	Nitrogen_30%/CO2_70%					0
phi=0.5								
45	535	90	N2_50%/CO2_50%	19.90	740.65	6.58	60.51	1
46	537	90	N2_50%/CO2_50%	20.00	740.85	6.33	59.89	1
47	537	90	N2_50%/CO2_50%	19.96	740.50	4.92	59.96	1
48	535	90	N2_50%/CO2_50%					0
49	1070	90	N2_50%/CO2_50%	40.20	742.10		17.49	1
50	1070	90	N2_50%/CO2_50%	40.16	741.90		17.18	1
51	1070	90	N2_50%/CO2_50%	40.18	742.00		17.34	1
52	1070	90	N2_50%/CO2_50%					0
53	535	105	N2_50%/CO2_50%	19.69	764.50		60.02	1

54	535	105	N2_50%/CO2_50%	19.68	764.45		59.99	1
55	535	105	N2_50%/CO2_50%	19.70	764.60		59.06	1
56	535	105	N2_50%/CO2_50%					0
57	500	130	N2_80%/CO2_20%	19.65	875.50		19.42	1
58	500	130	N2_80%/CO2_20%	19.48	873.90		19.80	1
59	500	130	N2_80%/CO2_20%	19.56	874.65		19.21	1
60	502	130	N2_80%/CO2_20%					0
61	1070	100	Nitrogen_50%/CO2_50%	39.77	758.50	4.50	18.40	1
62	1070	100	Nitrogen_50%/CO2_50%	39.80	758.65	4.26	17.24	1
63	1072	100	Nitrogen_50%/CO2_50%	39.75	758.15	3.09	17.19	1
64	1070	100	Nitrogen_50%/CO2_50%					0
65	1000	100	Nitrogen_60%/CO2_40%	38.31	779.25	4.58	18.63	1
66	1050	100	Nitrogen_60%/CO2_40%	40.02	778.45	4.57	17.42	1
67	1050	100	Nitrogen_60%/CO2_40%	39.84	777.75	4.36	16.15	1
68	1050	100	Nitrogen_60%/CO2_40%					0
69	1050	115	Nitrogen_60%/CO2_40%	39.22	801.40	4.37	15.79	1
70	1050	115	Nitrogen_60%/CO2_40%	39.86	804.00	4.57	16.92	1
71	1050	115	Nitrogen_60%/CO2_40%	39.39	802.10	5.16	15.70	1
72	1050	115	Nitrogen_60%/CO2_40%					0
73	1000	115	Nitrogen_80%/CO2_20%	39.63	850.55		12.53	1
74	1000	115	Nitrogen_80%/CO2_20%	39.62	850.55		12.10	1
75	1000	115	Nitrogen_80%/CO2_20%	39.55	850.20		11.38	1
76	1000	115	Nitrogen_80%/CO2_20%					0
77	500	115	Nitrogen_80%/CO2_20%	19.45	847.20		38.84	1
78	500	115	Nitrogen_80%/CO2_20%	19.16	844.50		39.04	1
79	500	115	Nitrogen_80%/CO2_20%	19.32	846.05		35.43	1
80	500	115	Nitrogen_80%/CO2_20%					0
81	500	100	Nitrogen_80%/CO2_20%	19.79	822.35		46.74	1

82	500	100	Nitrogen_80%/CO2 20%	19.48	819.60		49.87	1
83	500	100	Nitrogen_80%/CO2 20%	19.86	822.95		47.94	1
84	500	100	Nitrogen_80%/CO2 20%					0
85	500	85	Nitrogen_80%/CO2 20%	19.95	795.50		58.29	1
86	500	85	Nitrogen_80%/CO2 20%	19.93	795.25		64.65	1
87	500	85	Nitrogen_80%/CO2 20%	19.95	795.45		66.06	1
88	500	85	Nitrogen_80%/CO2 20%					0
89	463	120	Nitrogen_100%	19.1	917.5		6.113	1
90	464	120	Nitrogen_100%	19.13	917.4		5.567	1
91	463	120	Nitrogen_100%	19.14	917.9		5.648	1
92	464	120	Nitrogen_100%	19.35	920			0
93	464	105	Nitrogen_100%	19.6	892.1		11.72	1
94	464	105	Nitrogen_100%	19.45	890.5		12.08 9	1
95	464	105	Nitrogen_100%	19.46	890.6		11.64 4	1
96	466	105	Nitrogen_100%	19.8	890			0
97	464	92	Nitrogen_100%	20.02	869.65		20.16 2	1
98	464	92	Nitrogen_100%	19.88	868.3		20.2	1
99	464	92	Nitrogen_100%	19.83	867.8		20.68 2	1
100	467	92	Nitrogen_100%	20.51	870			0