Supplementary Materials:

Table S1: Combination parameters of blended fuel at a constant volume flow rate V_{total} = 11.78 L/min for typical flame patterns.

V_{air} (L/min)	$V_{methane}$ (L/min)	$V_{Hydrogen}$ (L/min)	$V_{Carbon\ monoxide}$ (L/min)	$H_2/C($ (Syng	ϕ	Re
9.35	0.50	1.25	0.68	65/35	1.0	1622
9.35	0.50	1.54	0.39	80/20	1.0	1602
8.83	0.50	0.98	1.47	40/60	1.2	1636
8.83	0.50	1.23	1.23	50/50	1.2	1620
8.83	0.50	1.96	0.49	80/20	1.2	1571
8.36	0.50	0.88	2.04	30/70	1.4	1640
8.36	0.50	1.17	1.75	40/60	1.4	1621
8.36	0.50	1.46	1.46	50/50	1.4	1602
8.36	0.50	2.33	0.58	80/20	1.4	1542
7.21	0.50	0.81	3.25	20/80	2.0	1637
7.21	0.50	1.22	2.84	30/70	2.0	1611
7.21	0.50	2.03	2.03	50/50	2.0	1556
7.21	0.50	3.25	0.81	80/20	2.0	1464

Table S2: Volume concentration of each fuel in the entire fuel mixture.

ϕ	H_2/CO (Syng	$X_{methane}$ (vol%) (in total fuel)	$X_{Hydrogen}$ (vol%) (in total fuel)	$X_{Carbon\ monoxide}$ (vol%) (in total fuel)
1.0	65/35	20.60	51.44	27.96
1.0	80/20	20.60	63.37	16.03
1.2	40/50	16.95	33.22	49.83
1.2	50/50	16.95	41.55	41.50
1.2	80/20	16.95	66.44	16.61
1.4	30/70	14.63	25.73	59.64
1.4	40/60	14.63	34.21	51.16
1.4	50/50	14.63	42.69	42.68
1.4	80/20	14.63	68.33	17.04
2.0	20/80	10.96	17.76	71.28
2.0	30/70	10.96	26.75	62.29
2.0	50/50	10.96	44.52	44.52
2.0	80/20	10.96	71.27	17.77