Supporting Information

Modeling and Simulation of Motion and Gasification Behaviors of Super-ellipsoidal Biomass Particles in an Entrained-Flow Reactor

Runhui Zhang[a], Xiaoke Ku[a,b,*], Shuna Yang[c], Jin Wang[a], Liwu Fan[b]

[a]Department of Engineering Mechanics, Zhejiang University, 310027 Hangzhou, China

[b]State Key Laboratory of Clean Energy Utilization, Zhejiang University, 310027 Hangzhou, China

[c]School of Communication Engineering, Hangzhou Dianzi University, 310018 Hangzhou, China

[*] Corresponding author. Tel.: +86 57187952221. E-mail address: xiaokeku@zju.edu.cn (X. Ku).

Table S1. A comparison of the quantitative data of gas and char productions between models and experiment

Temperature	Experiment[a]	Spherical Model	Average Error of Spherical Model	Non-spherical Model				Average Error of Non-spherical Model
				AR=2, *n*=2	AR=2, *n*=4	AR=6, *n*=2	AR=6, *n*=4	
Production of H_2 (Nm^3/kg daf biomass)								
1273.15 K	0.275	0.335	21.83 %	0.3196	0.3127	0.3279	0.3357	17.79 %
1373.15 K	0.351	0.403	14.82 %	0.4018	0.3927	0.4022	0.3966	13.49 %
1473.15 K	0.411	0.479	16.55 %	0.4688	0.4657	0.4889	0.4735	15.35 %
1573.15 K	0.483	0.557	15.27 %	0.5495	0.5356	0.5786	0.5633	15.19 %
1673.15 K	0.542	0.605	11.66 %	0.5962	0.6038	0.6367	0.6266	13.70 %
Production of CO (Nm^3/kg daf biomass)								
1273.15 K	0.290	0.213	26.40 %	0.2046	0.2028	0.2119	0.2200	27.55 %
1373.15 K	0.350	0.303	13.25 %	0.3054	0.2996	0.3056	0.3030	13.09 %
1473.15 K	0.449	0.416	7.27 %	0.4152	0.4117	0.4322	0.4178	6.65 %
1573.15 K	0.548	0.542	1.01 %	0.5540	0.5384	0.5827	0.5655	3.14 %
1673.15 K	0.617	0.640	3.78 %	0.6534	0.6615	0.6940	0.6833	9.11 %
Production of CO_2 (Nm^3/kg daf biomass)								
1273.15 K	0.369	0.392	6.36 %	0.3981	0.3854	0.3886	0.3932	5.98 %
1373.15 K	0.350	0.352	0.67 %	0.3789	0.3688	0.3631	0.3561	4.83 %
1473.15 K	0.304	0.310	1.78 %	0.3255	0.3245	0.3234	0.3154	5.91 %
1573.15 K	0.278	0.271	2.61 %	0.2819	0.2767	0.2797	0.2767	0.74 %
1673.15 K	0.257	0.240	6.48 %	0.2444	0.2476	0.2465	0.2430	4.49 %
Production of char (ash excluded) (g/kg daf biomass)								
1273.15 K	-	-		134.7	148.9	144.2	139.8	
1373.15 K	-	-		103.5	117.6	120.2	128.6	
1473.15 K	-	-	-	86.5	93.8	85.4	100.7	-
1573.15 K	-	-		43.5	59.6	36.0	49.9	
1673.15 K	-	-		15.0	13.6	2.5	9.1	

[a]The experimental data are extracted from the work of Qin et al. (Qin, K.; et al. Energy Fuels 2012, 26, 5992-6002).