Agglomeration mechanism in biomass fluidized bed combustion – Reaction between potassium carbonate and silica sand

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Figure A1: $\text{K}_2\text{CO}_3$ conversion rates of repeated experiments. $T = 800 \, ^\circ\text{C}$ Pure N$_2$ environment; $\text{K}_2\text{CO}_3$:SiO$_2$ ratio = 3:100; well mixed mixtures; powder $\text{K}_2\text{CO}_3$; total residence time 4h.

Figure A2: Thermodynamic calculations of pure $\text{K}_2\text{CO}_3$ under N$_2$ and CO$_2$ atmosphere
Figure A3: XRD analysis. Sample 1: SiO$_2$:K$_2$CO$_3$ mole ratio 1:0.013; pure N$_2$; 4h residence time. Sample 2: SiO$_2$:K$_2$CO$_3$ mole ratio 1:1; pure N$_2$; 24h residence time.