

Table S4: Carbonation-calcination TGA cycle with regeneration in CO<sub>2</sub> and no reduction between cycles (100CO<sub>2</sub>)

| Step                                | Flow       | Gas composition  | Temperature  | Time/rate |
|-------------------------------------|------------|--|--------------|-----------|
| Carbonation                         | 500 ml/min | 15/50/35 vol% CO <sub>2</sub> /H <sub>2</sub> O/N <sub>2</sub> | 650°C        | 25min     |
| Heating to regeneration temperature | 500 ml/min | 100 vol% CO <sub>2</sub>                                       | 650 to 925°C | 9°C/min   |
| Regeneration                        | 500 ml/min | 100 vol% CO <sub>2</sub>                                       | 925°C        | 6min      |
| Cooling to carbonation temperature  | 500 ml/min | 100 vol% N <sub>2</sub>  | 850 to 650°C | 3.5°C/min |