



Calcium and Chemical Looping Technology for Power Generation and Carbon Dioxide (CO₂) Capture

Edited by Paul Fennell and Ben Anthony

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Preface

Carbon capture and sequestration (CCS) are essential technologies if we are not to have to spend ruinously in converting our energy supply in its entirety to renewable sources and to avoid very dangerous rises in average global temperatures. In order for this to happen there must first be the political will, a subject beyond the scope of this book, and the availability of cheap, effective methods of achieving widespread implementation of CCS technology. Low cost, in particular, will make CCS more palatable and hasten its universal adoption.

To this end, there is a continuous effort on the part of the global R&D community to develop cheaper and better methods of carbon capture and sequestration. While amine scrubbing in its various forms still represents the gold standard, and is finally seeing its first full-scale demonstrations, the cost and other aspects of this technology remain problematic. To that end, the use of solids instead of liquids to capture CO_2 and release it in a concentrated form in combustion, gasification, and reforming or to convert hydrocarbon fuels directly to CO_2 and H_2O , thus allowing the production of pure CO_2 streams has become increasingly important.

This book examines two new technologies designed to achieve these ends: Ca looping for CO_2 capture and chemical looping combustion (CLC) for fuel conversion using solid oxygen carriers. Both technologies have been under development by the research community in the last couple of decades and both technologies have now been implemented at the large pilot plant scale (several MWt). While Ca Looping and CLC technologies still await demonstration at the industrial scale, they continue to be explored in several hundred centers worldwide. This book presents these two technologies and demonstrates that both of them represent vibrant areas of research and that both have the potential to significantly advance CCS technology at the industrial and utility level.

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