Preface

Carbon capture and storage (CCS) is a process by which carbon dioxide (CO2) from industrial installations is separated before it is released into the atmosphere, then transported to a long-term storage location. 2221 The CO2 is captured from a large point source, such as a natural gas processing plant and is typically stored in a deep geological formation. Around 80% of the CO2 captured annually is used for enhanced oil recovery (EOR), a process by which CO2 is injected into partially depleted oil reservoirs in order to extract more oil and then is largely left underground. Since EOR utilizes the CO2 in addition to storing it, CCS is also known as carbon capture, utilization, and storage (CCUS).

Oil and gas companies first used the processes involved in CCS in the mid 20th century. Early CCS technologies were mainly used to purify natural gas and increase oil production. Beginning in the 1980s and accelerating in the 2000s, CCS was discussed as a strategy to reduce greenhouse gas emissions. Around 70% of announced CCS projects have not materialized, with a failure rate above 98% in the electricity sector. As of 2024 CCS was in operation at 44 plants worldwide, collectively capturing about one-thousandth of global carbon dioxide emissions. 90% of CCS operations involve the oil and gas industry.15 Plants with CCS require more energy to operate, thus they typically burn additional fossil fuels and increase the pollution caused by extracting and transporting fuel.[1]

In the present book, nine typical literatures about Carbon capture and storage published on international authoritative journals were selected to introduce the worldwide newest progress, which contains reviews or original researches on Carbon capture and storage. We hope this book can demonstrate advances in Carbon capture and storage as well as give references to the researchers, students and other related people.

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[1] https://en.wikipedia.org/wiki/Carbon_capture_and_storage