

PHENOTHIAZINE-BASED POLYMER FOR CARBON DIOXIDE CAPTURE



THE INVENTION

Carbon capture and sequestration (CCS) is considered as one of the most powerful techniques to control CO₂ levels in atmosphere. Porous organic polymers have been widely used as adsorbents due to their high uptake and selective CO₂ capture properties. A main issue that industry faces regarding the CO₂ capture is contamination by water, as it binds to the active sites of the adsorbing material decreasing its adsorbing abilities. This invention is a novel porous polymer based adsorbent (KFUPM-2) that has superior dynamic CO₂ uptake under severely humid conditions.

MARKET

A snapshot of the global CO₂ market is provided in Fig. 1, post-combustion CO₂ processing takes up close to 30% of the overall CO₂ market [1]. Capturing the emitted CO₂ and sequestering it is thus one of the major global markets. According to a market report [2]. In 2018 CCS market was estimated to be worth of USD 4.68 billion and is projected to grow at a CAGR of 7.9% over the forecast period.

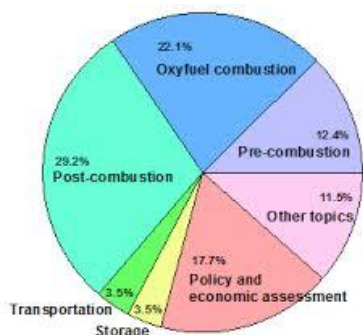


Fig.1 Global CO₂ market distribution based on type.

COMPETITIVE ADVANTAGE

- The KFUPM-2 polymer has been synthesized using low-cost monomers thus making the synthesis process less costly.
- KFUPM-2 polymer can be regenerated within acceptable limits of usability at ambient temperatures by using simple nitrogen gas.
- The polymer has shown acceptable levels of selectivity under highly humid environments

PROJECT STATUS

The invention in its current state is at Technology Readiness Level (TRL) 4. The KFUPM-2 polymer was synthesized and tested as solid sorbent for selective CO₂ capture and separation under humid condition, relevant to industrial flue gas, providing a selectivity of 64% for CO₂ over N₂.

LOOKING FOR A DEVELOPMENT PARTNER

KFUPM would like to talk to companies and partner in performing additional experiments for longer time durations and at higher temperatures and ultimately to license the intellectual property.

PATENT PROTECTION

A patent application US16/40043 is currently pending at the USPTO.

ABOUT KFUPM

King Fahd University of Petroleum & Minerals is a leading educational organization for science and technology. KFUPM Innovation & Technology Transfer is the IP management and technology licensing office tasked with taking innovation from lab to market.

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[1]<https://www.journals.elsevier.com/applied-energy/article-selections/carbon-capture-and-storage-ccs>

[2]<https://www.marketwatch.com/press-release/at-79-cagr-carbon-capture-and-sequestration-ccs-market-size-is-expected-to-exhibit-468-billion-usd-by-2026-2019-06-25>