Additives For Improved Electrochemical Co2 Capture

Tech ID: 33571 / UC Case 2022-729-0

BRIEF DESCRIPTION

Current methods for CO_2 capture and concentration (CCC) are energy intensive due to the reliance on thermal cycles, which are intrinsically Carnot limited in efficiency. Electrochemical carbon dioxide capture and concentration (eCCC) is a modular approach that can achieve significantly higher energy efficiencies than current thermal methods, however eCCC systems have been plagued by oxygen instability. The Yang lab has developed an eCCC approach that is over three times more efficient than any other reported redox carrier-based system and almost twice the efficiency of state-of-the-art alkanolamine-based systems.

SUGGESTED USES

·Carbon capture from post-combustion glue gas

·Atmospheric carbon capture

FEATURES/BENEFITS

·Cost-effective

·Scalable

·Three times more efficient than other reported redox-carrier-bases systems

·Nearly twice the efficiency of state-of-the-art alkanolamine-based systems

TECHNOLOGY DESCRIPTION

Among the multiple approaches to eCCC, the utilization of redox-active carrier species is among the most popular. Several classes of redox-active carriers have been investigated for eCCC applications including: bipyridines, thiols, and quinones. While quinones have shown to be potent eCCC carriers in the absence of O2, all reported systems are incapable of operating under aerobic conditions. Since O2 is present in flue gas and atmospheric CO2 sources, practical eCCC methods must overcome this limitation. The Yang lab developed an eCCC approach that uses alcohol additives to stabilize a quinone through intermolecular hydrogen-bonding interactions, resulting in practical, cost-effective, and scalable electrochemical carbon dioxide capture and concentration.

STATE OF DEVELOPMENT

Experimentally confirmed in lab

PATENT STATUS

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OTHER INFORMATION

CATEGORIZED AS

» **Energy**
» Other
» **Environment**
» Other

RELATED CASES

2022-729-0

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Reference for National Filings	WO 2023/102480	06/08/2023	2022-729

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Carbon Dioxide Flow Battery

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