

PROJECT FACTS

UNIVERSITY OF KENTUCKY CENTER FOR APPLIED ENERGY RESEARCH

PARTICIPANTS

UK Center for Applied Energy Research
2540 Research Park Drive
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SPONSORS

US-China Advanced Coal Technology

PROJECT VALUE

US-China ACT:
\$2,224,997
UK: \$600,001

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POWER GENERATION & UTILITY FUELS

Carbon-Rich MEA Concentration through Capacitive Deionization

The capture of carbon dioxide from point sources such as coal plants is going to be of vital importance in the future. Capture solvents such as monoethanolamine (MEA) are successful at capturing carbon dioxide from these point sources, but the use of these solvents results in large parasitic energy costs when heated to release the carbon dioxide.

In this project, the temporary concentration of carbon-rich MEA is proposed using a capacitive deionization process (CDI) in an effort to lower the amount of liquid which must be processed during solvent regeneration. By temporarily concentrating the carbon-rich MEA ions, much smaller volumes of liquid will need to be heated to restore the MEA solvent and higher CO₂ evolution rates will be possible at the same temperature. These two benefits could drastically decrease the energy requirements of carbon dioxide capture. The CDI separation process used here has much lower minimum energy requirements than competing separation technologies such as reverse osmosis making this process desirable. Ongoing development in this project is focused on targeting cost effective, high surface area, and porous carbon materials as well as proof-of-concept performance.

