Energy and Carbon Capture Technology Research – Lab-Scale Studies

Developing an innovative, low-cost approach for carbon dioxide (CO₂) capture from burning coal during electrical generation

What is the issue?
Carbon dioxide (CO₂) emissions from coal-fired power plants and other industrial facilities need to be reduced as part of U.S. EPA’s Clean Power Plan. Current carbon capture technologies are very energy intensive and nearly double the cost of generating electricity. Therefore, U.S. Dept. of Energy (DOE) has set a goal of developing a technology that can remove 90% of the CO₂ released from coal combustion with a 30% lower cost of electricity than the current benchmark approaches.

What are we doing about it?
ISTC is working in collaboration with the Illinois State Geological Survey (ISGS) and the Applied Research Institute on campus and external partner Trimeric Corporation of Buda, Texas, to:
• Demonstrate a novel biphasic CO₂ absorption process (BICAP)
• Generate engineering and scale-up data for next-stage scale up.

Technology merits
• Multi-liquid-liquid phase separation (LLPS) allows low CO₂ loading throughout absorption, resulting in fast kinetics
• Biphasic solvents have larger working capacity
• Reduced mass and elevated presure for CO₂ stripping, resulting in low parasitic power loss

This collaborative project includes Dr. Yongqi Lu of ISGS and Drs. Kevin O’Brien and Wei Zheng at ISTC, both units of the Prairie Research Institute, and Dr. Santanu Chaudhuri of the Applied Research Institute (ARI) at the University of Illinois, as well as the Trimeric Corporation of Buda, Texas, as an external partner.