Pacific Northwest NATIONAL LABORATORY

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Battelle Number(s):

15845, 16354, 16034, 16192, 16530, 16778, 16957

Patent(s) Issued

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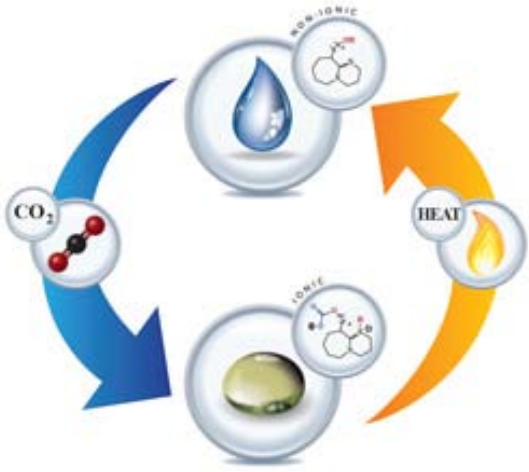
U.S. DEPARTMENT OF ENERGY

Available Technologies

# Binding Organic Liquids

## SUMMARY

Researchers at Pacific Northwest National Laboratory have developed a reusable organic liquid that can pull harmful gases such as carbon dioxide or sulfur dioxide out of industrial processes, natural gas streams, and emissions from power plants. The process could directly replace current methods and capture double the amount of harmful gases in a way that uses no water, less energy, and saves money.




Harmful gases such as carbon dioxide or sulfur dioxide are called "acid gases." The new scrubbing process uses acid gas-binding organic liquids that contain no water and can hold up to three times more harmful gases by weight than the current leading liquid solvents. The net result is a significantly lower regeneration energy requirement.

Binding organic liquids are comprised of a combination of an alcohol and strong organic base that grabs the carbon dioxide. The system has been dubbed by PNNL researchers as the "Swiss Army Knife" of chemical solvents because of the ability to tailor the specific chemistry to the specific gas separation application. The Laboratory's previous work with the binding organic liquids focused on pulling only carbon dioxide out of emissions from power plants. However, the tool may be used in a number of industrial process applications and for removal of carbon dioxide from natural gas production streams. The researchers have also developed systems that bind sulfur dioxide, carbonyl sulfide, and carbon disulfide.

## ADVANTAGES

* Low regeneration energy. Estimates show a 50% lower energy requirement for flue gas separations compared to the competing commercial option.

* Reduced costs. As a result of low water use in the system, lab tests indicate significantly potentially less corrosion and less damage to the system.

* Applicable to multiple gas impurities (i.e. CO2, SO2, COS, etc.), which enables an integrated emissions treatment system.

* Theoretical capacities as high as 300% by weight and up to 50% more CO2 by

volume compared to commercially available, water-based systems.

* Multiple industrial process applications

## RELATED LINKS

» **Energy Processes & Materials Division**
Learn more about focus areas and emerging research
*http://energy-proc-mat.pnnl.gov/*

### Patents & Intellectual Property

» Patent #: 7,799,299

» Patent #: 8,652,237

### Technology Portfolio(s)

» Carbon Capture & Sequestration

» Carbon Capture & Sequestration

### Potential Industry Applications

» Chemicals

» Energy & Utilities

» Oil & Gas

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