

# Innovation and Commercialization

UNIVERSITY OF TEXAS  ARLINGTON

## Low Net Heat of Adsorption of Ethylene Achieved by Major Solid-State Structural Rearrangement of a Discrete Copper Complex

**Tech ID:** UTA 16-41

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### TECHNOLOGY NEED

In the production of ethylene, it is essential to remove the by-products. Ethane gas is the most dominant by-product created when ethylene is being produced commercially and the most popular method for ethane gas separation from ethylene is cryogenic distillation. But the energy used for cryogenic distillation (using low boiling points to separate mixtures) of ethylene is equivalent to approximately 1.25% of the United States' total electricity consumption with an estimated cost of \$3.8 billion per year which is a lot. If that energy was provided by coal-fired power plants, the energy use would equate to 50 million metric tons of carbon dioxide, roughly 1% of total US carbon dioxide emissions. So there is a need for a method which consumes very less power compared to cryogenic distillation and also environment friendly.

### INVENTION DESCRIPTION/SOLUTION

In this invention we have overcome the problem of extensive power loss and consumption during ethane gas removal from ethylene. We have used a solid-state sorbent (a substance which has the property of collecting molecules of another substance by sorption) that can selectively bind significant amount of ethylene gas and very little ethane gas with selectivity up to 80%. This sorbent can therefore replace the current method for ethylene/ethane separation on a commercial scale reducing the costs of production significantly. Also, this sorbent which is copper based can operate without additional solvent and can reversibly bind and release acetylene.

### APPLICATIONS

- Separation of Ethylene/Ethane
- Petrochemical Industries

### KEY BENEFITS

- Low power consumption
- Low cost of production
- Environment friendly

### STAGE OF DEVELOPMENT

Prototype

### INTELLECTUAL PROPERTY STATUS

Provisional



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