Efficient collection of carbon dioxide using ion exchange resin and vacuum-assisted degasification

Technology #m10-120

Carbon emissions from fossil fuels are an increasing source of global concern, and the reduction of these emissions is a complex issue that involves both technological and geopolitical solutions. Carbon capture provides an alternative approach for the management and reduction of carbon emissions by removing existing carbon dioxide from the air. This technology captures carbon dioxide from the atmosphere onto an anionic exchange resin, and subsequently releases it into solution when the resin is washed with water. Through this technology, the impact of carbon dioxide on climate change may be reduced.

Anionic exchange resin increases speed and efficiency of carbon capture

Anionic exchange resins absorb carbon dioxide when dry and emit it when wet. Such resins (and similar carbon dioxide sorbents) can therefore transfer carbon dioxide to water via washing. Raising the alkalinity of water significantly increases its capacity for carbon dioxide improving the efficiency of carbon capture. The dissolved carbon dioxide is then transferred from the water to a vacuum chamber via a selective membrane in a gas-exchange device. The degassed water can then be recycled to wash the carbon dioxide-containing resin for continuous carbon dioxide capture.

A prototype of this technology has been developed and tested.

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Applications:

- Collection of carbon dioxide for commercial applications
- Reduction of atmospheric greenhouse gas to manage and reduce global warming
Advantages:

- Uses non-toxic materials
- Low energy requirements
- Less expensive to operate than chemical pumps
- Components are reusable, and are continuously recycled

Patent Information:

Patent Pending (US 20140219899)

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Related Publications:


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