

TECHBRIEF

IMPROVED PELLETIZED IMMOBILIZED AMINE SORBENTS FOR CO₂ CAPTURE

OPPORTUNITY:

This invention describes basic immobilized amine sorbents (BIAS) with improved pelletization process and formulation for use in CO₂ capture processes. This technology is available for licensing and/or further collaborative research from the U.S. Department of Energy's National Energy Technology Laboratory.

CHALLENGE:

BIAS sorbents demonstrate high CO₂ capture capacity and thermal stability over multiple steam regeneration cycles and represent a promising approach for CO₂ removal from a variety of source points, including coal and natural gas combustion power plants. Bench- and pilot-scale testing have demonstrated the feasibility of commercial-scale BIAS sorbents. However, full commercialization of BIAS sorbents requires pelletization. Commercially available silica typically serves as the support for amine-based particle sorbents, yet these materials are not commercially feasible due to their relatively low mechanical strength and difficult management in dynamic reactor systems. Thus, the development of an economical method of fabricating a strong silica-supported BIAS pellet is a primary concern.



OVERVIEW:

This technology describes a method to generate pelletized BIAS sorbents using low-cost inorganic binders, such as fly ash and polymer binders as well as with polychloroprene latex. The technology also describes using a novel cross linker and antioxidant during pellet functionalization. The process generates low-cost amine-based sorbents with high mechanical strength, high CO₂ capture capacity, and long-term CO₂ capture stability. The pelletized sorbents can be used for packed bed, moving bed and other reactor configurations. The pellets can also be used under both pressure and temperature swing conditions.

(continued)



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ADVANTAGES:

- Demonstrates high mechanical strength and CO₂ capture capacity.
- Provides an economical alternative for pelletization of amine-based sorbents.
- Offers a scalable pelletization process.
- Has the potential for greater CO₂ capture stability in the presence of water vapor and oxygen.

APPLICATIONS:

- Conversion of CO₂ to CO for CO₂ utilization applications.
- Production of industrial CO from CO₂ captured from power plants.
- Production of CO to generate revenue to offset costs associated with implementation of CO₂ capture technologies.

PATENT STATUS:

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Title: A Pelletized Basic Immobilized Amine Sorbent (BIAS) Utilizing Fly Ash and Polymer Binders

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