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Carbon Dioxide Sorbents on Adhesive Film for Efficient Gas Uptake

-Potential Applications • High-performance CO₂ direct air capture (DAC)
Benefits and Advantages • Cost effective and readily scalable • Easy to fabricate into various shapes with virtually any sorbent type • Short preparation time (10 minutes for two layers of adhesive film) • Regenerable and maintains performance after hot steam treatment
Invention Description Researchers at Arizona State University have developed a novel adhesive film ($\leq 250 \mu\text{m}$ thickness) that can be covered with sorbent beads or particles to efficiently uptake CO₂ gas from passive ambient airflow. These lightweight adhesive films can accommodate a diverse range of sorbent sizes and types, from powders to large particles. With this sorbent support structure, ample surface area is provided for effective absorption of CO₂ gas with minimal sorbent loss, even after steam regeneration. This sorbent-coated film can be stacked in multiple layers, which permits tuning of the total sorbent mass of the system. Background Many sorbent materials used for CO₂ uptake are in the form of fine powders, beads, or pellets. These materials have physical properties that do not allow for shaping into linear or sheet-like structures, which would provide more effective CO₂ uptake from the air. Additionally, though some of these materials have excellent sorbent characteristics, structural support is required to facilitate airflow exposure without becoming entrained in the gas stream or dropped from the contactor during operation. [Research Homepage of Professor Matthew Green](#)[Faculty Profile of Professor Klaus Lackner](#)[Faculty Profile of Professor John Cirucci](#)

