NETL INVENTS NOVEL THIN FILM COMPOSITE MEMBRANE FOR POST-COMBUSTION CO_2 CAPTURE

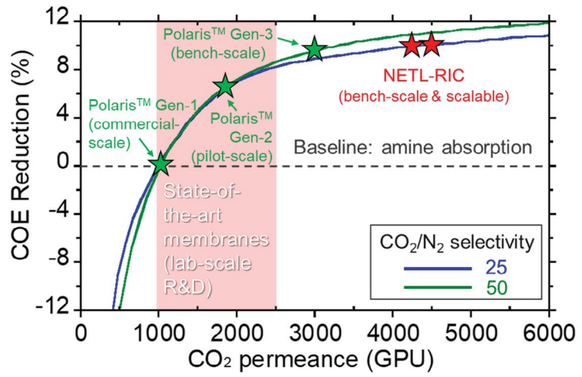
Superior membrane support plus a superior polymer blend material result in NETL's high-performance membrane.

NEW POLYMERIC MEMBRANES OUTPERFORM COMMERCIAL MEMBRANES

Membranes with extremely high permeance are needed to make membrane technology economically viable.

NETL's answer is a thin film composite membrane for post-combustion carbon capture. It has a demonstrated CO_2 permeance of > 4200 Gas Permeance Units (GPU) and CO_2/N_2 selectivity of >30 under lab conditions, **far outperforming any commercially available polymer membranes**.

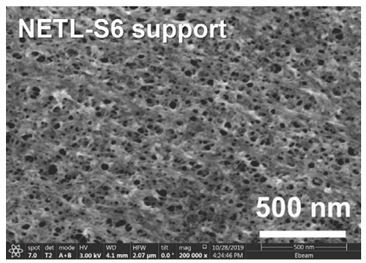
The membrane is a new high-permeance polymer support overlaid with an ultra-thin selective layer of a novel rubbery polymer blend.



Cost of Electricity (COE) Cost Analysis Performed by NETL-RIC for Coal Flue Gas Decarbonization Using Membranes vs. Commercial Amine Absorption

MEMBRANE SUPPORT DEVELOPMENT

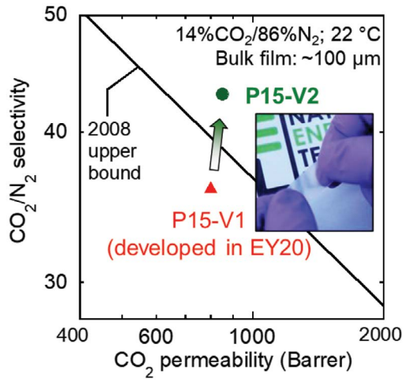
The novel and scalable nanoporous support provides much greater CO_2 permeance (260,000 GPU), surface porosity, and physicochemical stability than commercial polymer porous supports.

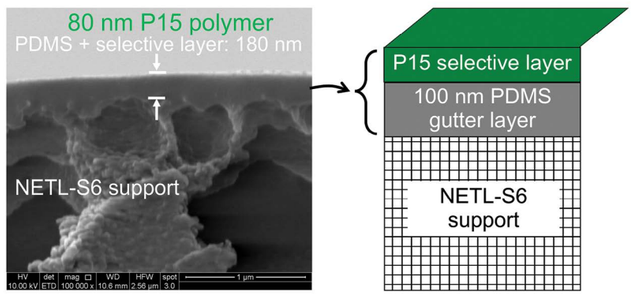


SELECTIVE LAYER MATERIAL AND THIN-FILM DEVELOPMENT

NETL P15 rubbery polymer blends have excellent CO_2/N_2 separation performance and anti-aging properties.

The CO_2/N_2 separation performance of sub-200 nm thin film composite membranes exceeds that of state-of-the-art membranes.



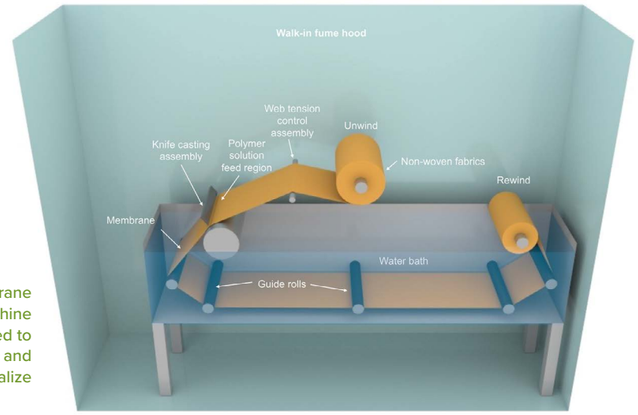


PATENTING AND SCALE-UP DEMONSTRATIONS

Path to Commercialization

NETL has submitted a non-provisional U.S. patent application for the membrane support, and another is being prepared for the selective material. The membrane support and selective material both have **high commercial potentials**. NETL has been working to **scale up the membrane for small module demonstrations in different industrial flue gas point sources** like coal-fired power plants, steel mills, and cement plants. NETL plans to establish collaborations with a commercial membrane manufacturer to further scale up and then mature this technology.

NETL's Membrane Test Unit at NCCC for Coal Flue Gas Decarbonization (Operational)



Roll-to-Roll Membrane Fabrication Machine Envisioned to Help Scale Up and Commercialize

PARTNERS

NATIONAL CARBON CAPTURE CENTER

Idaho National Laboratory

AWARD NUMBER
FWP-1022402

PROJECT BUDGET

EY21 FUNDING

- DOE $279,000
- PERFORMER..... $110,000

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DEMONSTRATE AND DEPLOY POINT-SOURCE CARBON CAPTURE

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