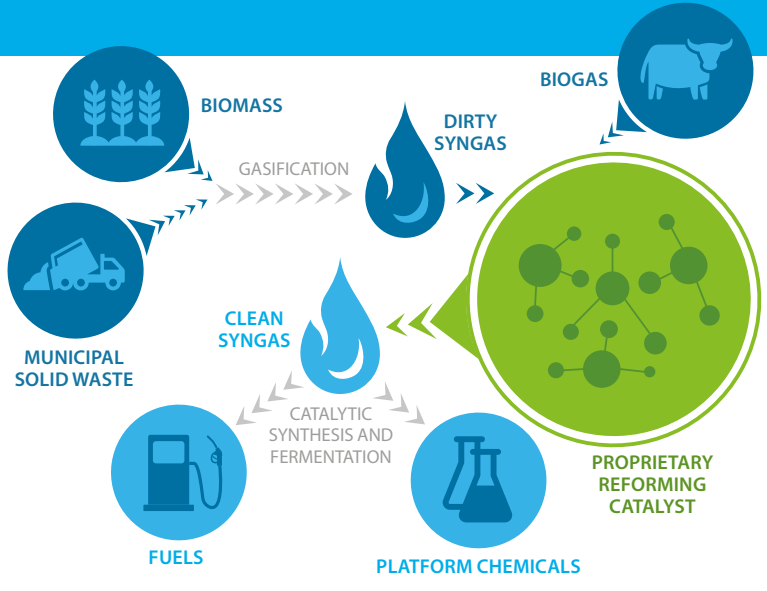
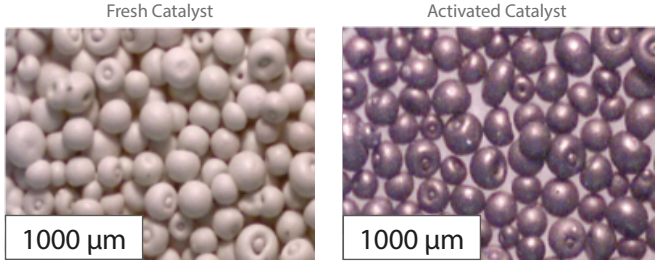
REFORMING PROCESS GAS TO FUELS AND CHEMICALS

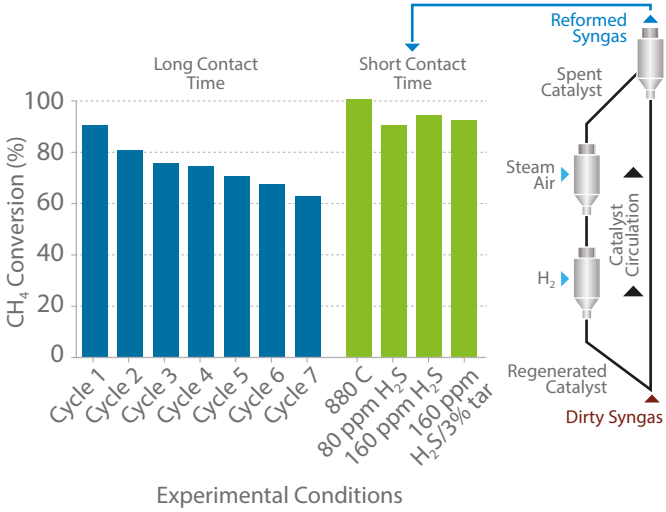
ADVANTAGES OF NREL'S REFORMING CATALYST

1. Developed in partnership with CoorsTek Ceramics; **readily scalable** for commercial processes using known catalyst manufacturing methods
2. Versatile catalyst for reforming gas streams from **biomass and waste conversion processes**
3. **Attrition resistant**, fluidizable reforming catalyst that can be used in circulating bed reactors
4. Extended catalyst lifetime by **reduced coking and enhanced sulfur tolerance**
5. **Readily regenerable** using industrially acceptable protocols
6. **Verified operation at extended time-on-stream** for cleaning biomass-derived syngas tars



Limiting catalyst contact time with syngas significantly reduced regeneration time while increasing catalyst lifetime and retaining reforming performance.





Experimental Conditions

VALUE PROPOSITION AND DIFFERENTIATORS

- **Low-cost** due to a nickel-based formulation made with commercial fluidizable alumina supports using industrial processes
- Can **maximize carbon utilization** and conserve process heat
- **Efficient methane and tar reforming** to syngas
- Capable of cleaning syngas from **mixed biomass, plastic, and food waste gasification**.

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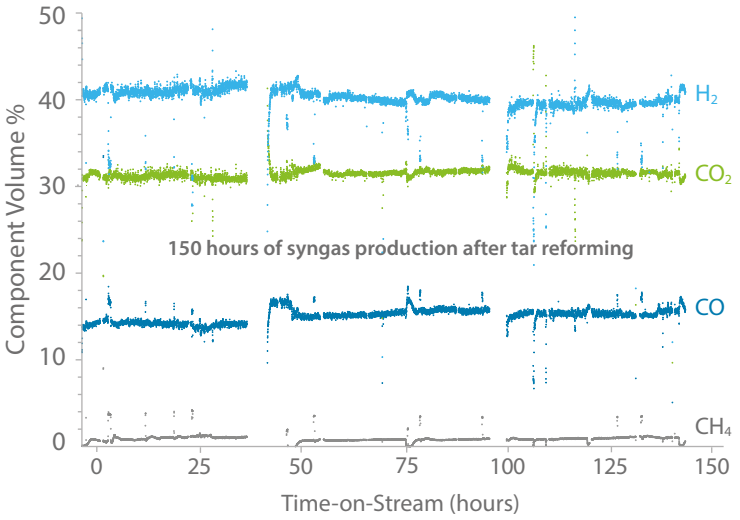
Verified reforming performance of NREL's fluidized catalyst for over 150 hours of operation at pilot scale.

Concentrations (g/Nm³)	Post Gasifier	Post Reformer	Conversion Across Reformer (%)
Argon	6.37	3.57	N/A
Benzene	7.18	2.26	44
Toluene	1.11	0.02	97
Phenol	0.05	0.00	100
Naphthalene	2.78	0.33	79
Anthracene and Phenanthrene	0.92	0.04	92
Other Tar	3.66	0.03	98
Heavy Tar	4.70	0.01	100
Total Tar	13.21		

NREL catalyst shows high conversion of tars, aromatics, and phenolic compounds.



Extended, stable conversion of tars and methane for producing syngas with H_2/CO >3.

WE ARE SEEKING STRATEGIC PARTNERSHIPS AND COOPERATIVE RESEARCH AND DEVELOPMENT

- Catalyst manufacturers and technology providers with a syngas portfolio looking to offer a fluidizable, attrition-resistant, and scalable catalyst for industrial use
- Military departments and contractors seeking to convert operating base waste to fuels as an alternative to incineration
- Technology integrators targeting a clean syngas stream from biomass, flared natural gas, biogas, and municipal solid waste for fuels and chemicals production.

CONTACT US to discuss how our technology can address your needs

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