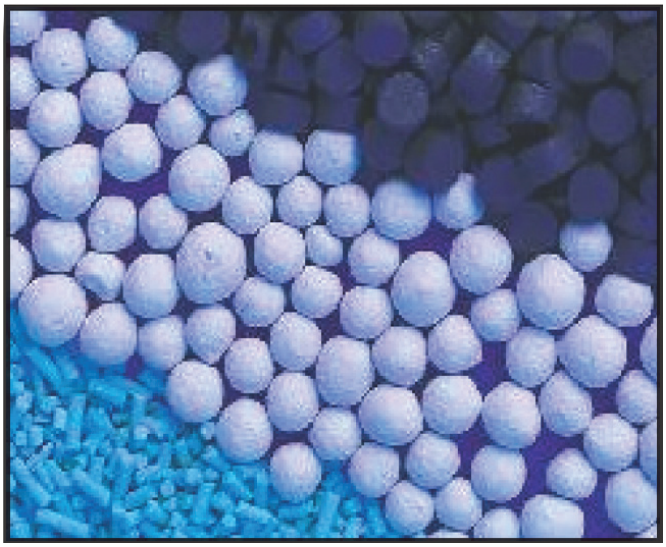
HiFUEL® Hydrogen Sulfide Removal Material

Johnson Matthey is a world leading developer of catalysts and processes for hydrogen generation from a range of feedstocks. The HiFUEL® catalyst range is designed specifically for distributed hydrogen generation systems and includes both base metal and precious metal formulations.



Fuel cells are being developed for a range of stationary, mobile and portable power generation appliations.

Fuel processors generate the fuel for the fuel cell by converting readily available hydrocarbons such as natural gas, LPG, gasoline and diesel, into a hydrogen-rich reformate stream.

Many of these fuels contain sulfur compounds that must be removed from the feedstock in order to avoid severe poisoning of the fuel processing and fuel cell catalysts.

HiFUEL® A310 is a high-porosity zinc oxide-based material for the removal of hydrogen sulfide (H_2S) from reformate streams.

Hydrogen sulfide can be removed from gaseous streams by chemical absorption on zinc oxide (ZnO), even in the presence of moisture and carbon dioxide. There is no measurable heat of absorption and so the process requires no heat input or removal.

HiFUEL® A310 will not remove organic sulfur species such as odorants. Although some organic sulfides thermally break down at the optimal operating temperatures of HiFUEL® A310, this process is not efficient over zinc oxide, so other means of removing organic sulfides should be considered. This could be achieved by the use of an upstream absorbent, or by chemically converting the sulfur compounds to hydrogen sulfide over a hydrodesulfurisation catalyst or high-temperature, precious metal reforming catalyst.

HiFUEL® A310 has a spherical shape and open pore structure that results in sharp absorption profile and high sulfur pick-up capacity.

Item	Description	Sizes
45469	Zinc oxide based sulfur removal material, HiFUEL® A310	500g, 1kg, 2.5kg

HiFUEL™ Hydrogen Sulfide Removal Material

Chemical Composition	Zinc Oxide with binder
Physical Properties	Shape: Spherical Pellet Size: 2.8 - 4.75mm diameter Bulk density: 820 kg/m^3
Temperature **Pressure**	Recommended: 100-350°C Minimum: 20°C Maximum: 450°C Temperature of feed gas should be at least 20°C above dew point to avoid condensation Pressure has little to no effect on performance
Water Content	Equilibrium outlet hydrogen sulfide concentration would be expected based on temperature and moisture content
Contact Time	The optimal contact time is dependent on temperature. At 25°C for 40 seconds is recommended. ≥ 150°C for 20 seconds is recommended.
Capacity	Maximum sulfur loading is 15% wt/wt saturated. Temperature does have some effect on this. At ambient temperatures the sulfur uptake is 80% of this value. HiFUEL™ A310 is not regenerable.
Feed Quality	Not suitable for two-phase or liquid streams, or for vapour streams that contain hydrochloric acid (HCl).
Activation	No requirement.
Handling	Avoid contact with skin and clothes. Avoid breathing dust. Do not take internally. Consult the relevant safety data sheet for further information. Accidental contact of spent zinc oxide with acid will result in H_2S being released.
Disposal	Dispose according to local guidelines; refer to SDS

Johnson Matthey offers a complimentary range of precious metal fuel processing catalysts that have been developed specifically for fuel cell applications. For more information contact HiFUEL.coatedcatalysts@matthey.com.