

## Application 2056



### **Evaluation of a novel absorbent for anaerobic gas desulfurization**

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The main goal is to assess the suitability of a novel product, SULFCAT, for the desulfurization of anaerobic gases, and biogas in particular.

Hydrogen sulfide tolerance limit for high temperature fuel cells is less than 1 ppm. Among the existing desulfurization methods (e.g. biological scrubbing, biotrickling, alkali scrubbers, etc.) dry scrubbing products (absorbents) are unique in achieving outlet H<sub>2</sub>S concentrations below 1 ppm.

In the EFC13 presentation, entitled “Adsorptive removal of H<sub>2</sub>S in biogas conditions for high temperature fuel cell systems” (December 2013), different absorbents were tested. These absorbents may be classified in the following categories:

1. Activated Carbon (impregnated or non impregnated)
2. Alumina + oxidizer (KMnO<sub>4</sub>)
3. Natural clays (zeolyte, sepiolite)

The effect of different variables was reported (inlet gas relative humidity, temperature, H<sub>2</sub>S concentration, GHSV, gas matrix composition and filter geometry in terms of height/diameter of the filter).

SULFCAT belongs to a new group of absorbents which study and testing would shed some light on how it compares against already tested media (listed above). The testing variables could be homologous to those described in the earlier report. However, it is important to bear in mind that maximum GHSV for SULFCAT is 1.500 h<sup>-1</sup>. Therefore, it is suggested that a GHSV of 1.000 h<sup>-1</sup> is used, in order to take advantage of previous work already carried out with two activated carbons (page 10 of the presentation).

From an industrial point of view, the potential usage of this product would have a beneficial impact on the costs, since it is less expensive than activated carbons; furthermore, the spent product is non hazardous and hence may be landfilled.