

## **Comparison of Thermophysical Property Measurements of Alumina/Zeolites Stagnant Beds for CO<sub>2</sub> Capture**

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The feasibility of using alumina/zeolites solid sorbent as a suitable option to increase CO<sub>2</sub> capture efficiency is under test. The adoption of such materials is of main interest for retrofitting existing fossil-fueled thermoelectric plants with as few changes as possible to the existing boiler and power cycle. Furthermore, also the upgrading of biogas to bio methane can benefit from such a technology, considering that biogas contains more than 40 % of CO<sub>2</sub>. Since the process performances are affected by the efficiency of the heat exchange during regeneration phases of the sorbent (CO<sub>2</sub> release by heating and subsequent cooling) a precise knowledge of the thermal properties of the solid sorbent bed is essential. Different methods to measure the thermal conductivity of these porous/granular materials are tested: hot-disk, C-therm, hot needle, and guarded hot plate. The nature of the alumina/zeolites bed, consisting of spherical particles with more or less the same diameter (of the order of 2-3 mm), affects the measurement results depending on the more or less effective contact between the different probes and the material under test. The measurement results are critically discussed on the basis of a suitable thermal model of the stagnant bed assumed as a packing of spherical particles [1].

### References:

[1] S. Torquato, Random Heterogeneous Materials, Springer-Verlag, New York, 2002.