

S3.5.1 ADSORPTION AND THERMAL DESORPTION OF SILOXANES FOR THE PURIFICATION OF BIOGASES

Pierre Le Cloirec, Sylvain Giraudet, Rafael da Sylva Santos
Ecole Nationale Supérieure de Chimie de Rennes

The siloxanes are found as a trace compound in biogas. Removing siloxanes for the utilization of the biogas is required due to a thermal decomposition and the production of Silica. Adsorption by activated carbons is one of useful treatment processes to remove this kind of molecule.

Adsorption kinetics and isotherms of adsorption were determined for four types of activated carbons were chosen and two siloxanes (D4 cyclic and L3 linear siloxane).

Generally, the activated carbon, produced from wood, with the largest mesoporous volume had the highest efficiency, in comparison to the other adsorbents. However, surprisingly, during the adsorption, degradation by-products were observed and identified. For example, the Siloxane L3 decomposed into two siloxanes: Siloxane L2 and octamethyltrisiloxane. The cyclic siloxane D4 did not decompose.

Concerning the thermal desorption, the temperature of desorption as well as the amount of siloxanes desorbed were dependent on the type of activated carbon. In the case of siloxanes D4, a maximum of 15 wt% was desorbed up to 400 °C, which meant that higher temperatures would be required to achieve complete regeneration.