CO_2 CAPTURE ON ACTIVATED CARBONS UNDER REALISTIC OPERATION CONDITIONS

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Atmospheric CO_2 concentration is continuously increasing, reaching values higher than 405 ppm in September 2018. In order to reduce CO_2 emissions and to comply with the Paris agreement, one of the main actions is implementing carbon capture and storage technologies.

Among all the materials used for CO_2 capture applications, activated carbons (ACs) are the most interesting ones due to their high surface areas and micropore volumes, good CO_2 capture capacities at low temperatures, and low-cost regeneration after CO_2 adsorption.

In this study, the CO_2 capture performances of selected ACs were determined at temperatures between 25 and 120°C, with CO_2 concentrations ranging from 5 to 90 vol. %. The most efficient sample captured 2.86 mmol of CO_2 per g of AC at 25°C, using pure CO_2 at 1 bar. Finally, the stability of ACs capture performances upon cycling (i.e., for a minimum of 6 adsorption-desorption cycles) was evaluated. We concluded that CO_2 uptake of all samples were not affected by desorption temperature after cycling, and that CO_2 adsorption performances were more related to the volume of the narrowest pores and to their average pore size than to the surface area.

Preferred participation: Poster presentation