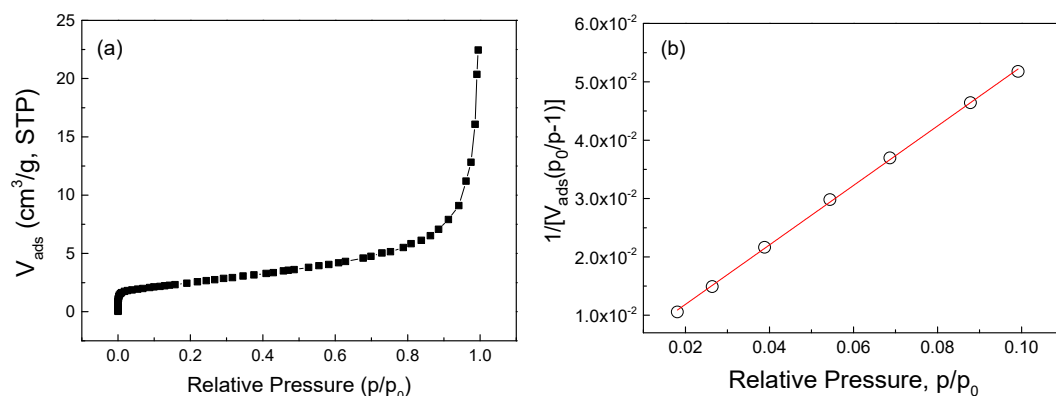
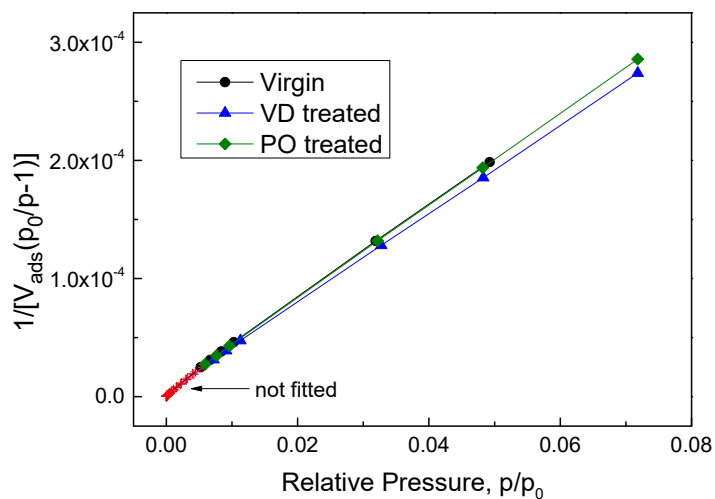


# Supplementary Material

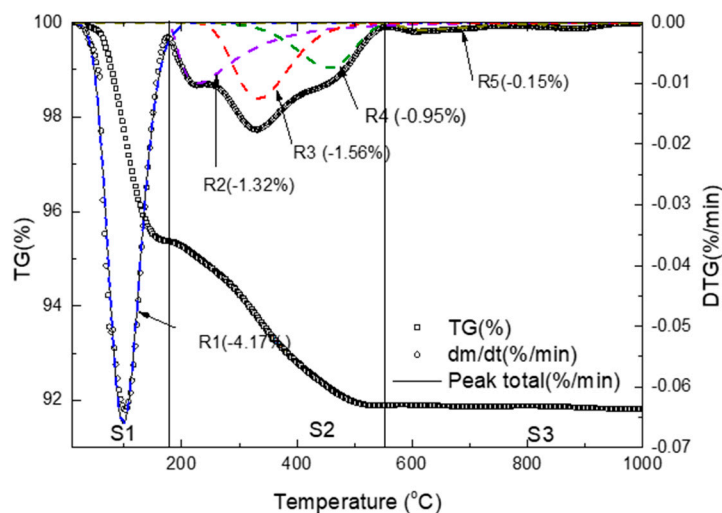
This Supplementary Materials contain: 2 Pages, 6 Figures



**Figure S1.** N<sub>2</sub> sorption isotherm (a) and BET surface area plot (b) for reference nonporous carbon [7].

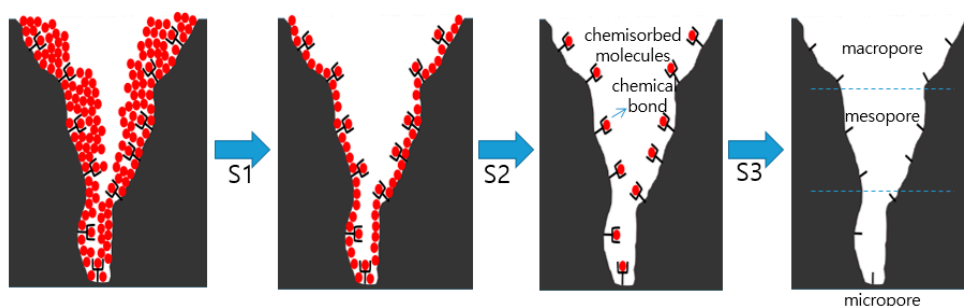


**Figure S2.** BET surface area plots for virgin, VD treated and PO treated GAC samples.

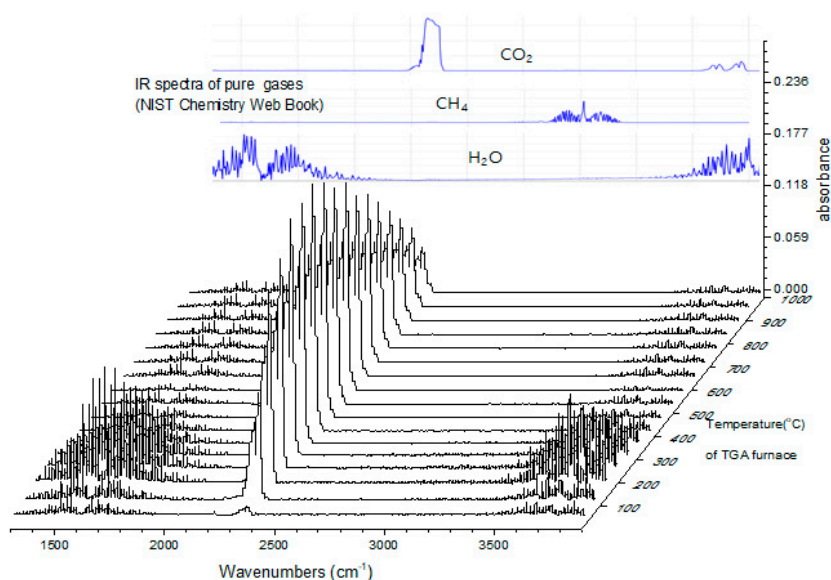


**Figure S3.** Mass change (TG) and derivative of the mass change (DTG) obtained from the TGA of SAC under an inert atmosphere (> 99.999% Ar) with a heating rate of 1 K/min, results of the deconvolution

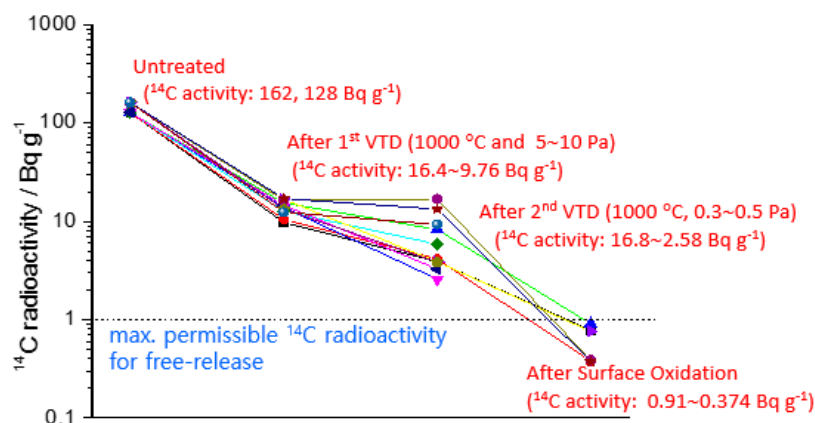
of the DTG plot into five peaks (dotted lines), and a comparison of the DTG (circle) and peak total (solid line).



**Figure S4.** Mass Schematic depiction of the two thermal desorption steps of SAC: S1 (desorption of homogeneously condensed molecules), S2 (desorption of physically binding molecules and decomposition of chemisorbed molecules with low thermal stability) and S3 (decomposition of chemisorbed molecules with high thermal stability).



**Figure S5.** IR spectra of evolved gases from the TG furnace during the thermal desorption of GAC, as shown in Figure 5, and the reference peaks of pure CO<sub>2</sub>, CH<sub>4</sub> and H<sub>2</sub>O [20-22].



**Figure S6.** Change in the <sup>14</sup>C radioactivity of the spent GAC sample after two vacuum thermal desorption tests and that after the partial oxidation of the VTD-treated GAC samples