

SUPPORTING INFORMATION

A Stamped Aluminium GC Column Disk Employing Directly Grown AAO Stationary Phase for Aromatic and Chlorinated Compounds Separation

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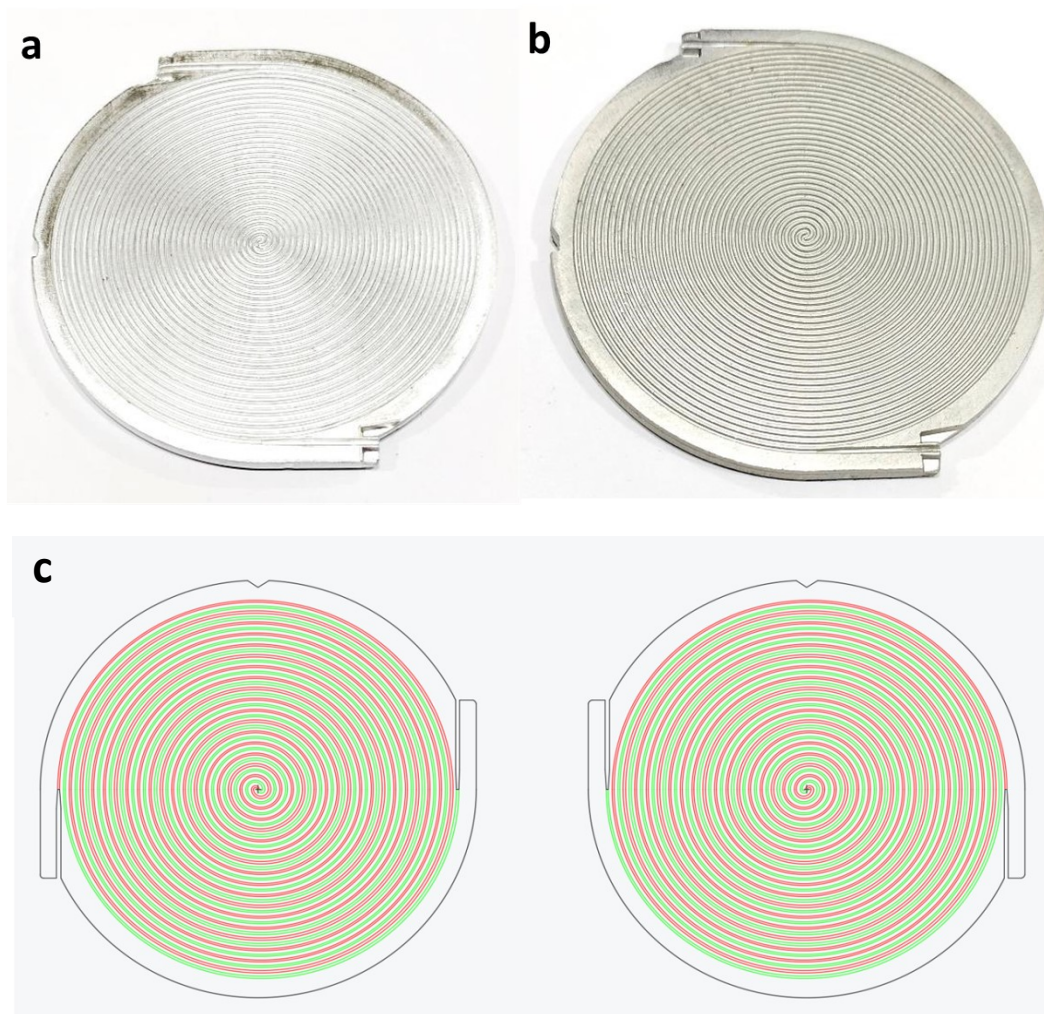


Figure S1. The photographs of the column during the processing steps, along with the design diagram of the 2nd generation AAO column.

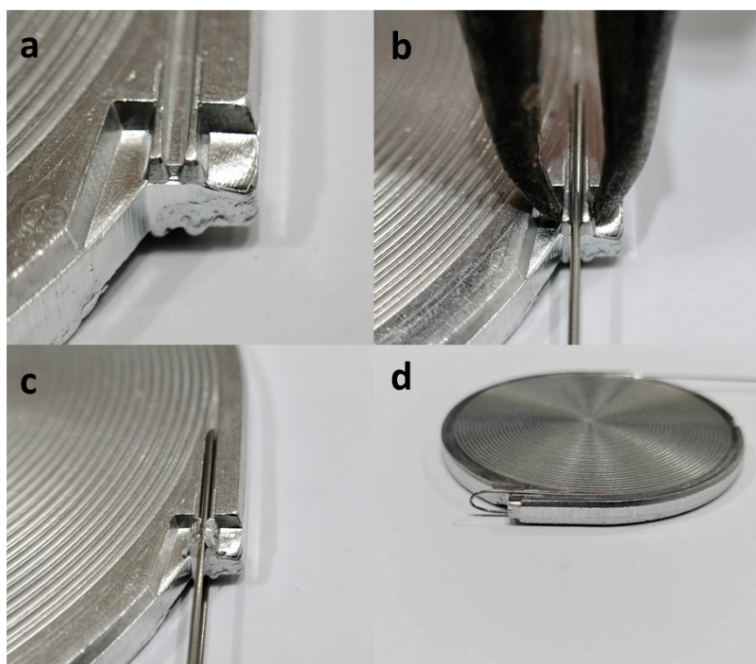


Figure S2. Photograph of the structure of inlet and outlet. (a) The groove designed for assembling the stainless steel capillary. (b) Hold the stainless steel capillary in place using a pair of pliers. (c) Once the pliers have gripped the stainless steel capillary, the aluminum tightly encases and firmly secures it in place. (d) The two sides of the flow channel are connected using U-shaped stainless steel capillary.

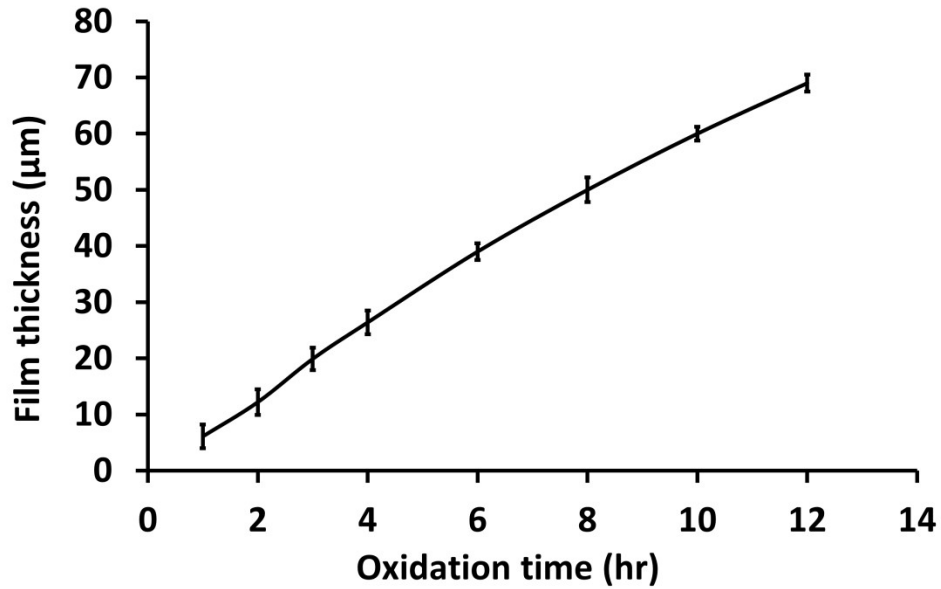


Figure S3. AAO Thickness vs. Anodization Time. The thicknesses can be controlled by the anodization time. We used an Eddy current thickness meter (ED-400, Shenyang TX Testing Instruments Inc., China) to measure the thickness of AAO on the flat aluminium sheet under the same anodization condition. For 50 repetitive measurements taken at different locations on the flat aluminium sheet, the standard deviation was 2.1 µm for 6.1 µm AAO (rounding to 6 µm), 2.3 µm for 12.2 µm AAO (rounding to 12 µm), and 2.0 µm for 19.8 µm AAO (rounding to 20 µm).

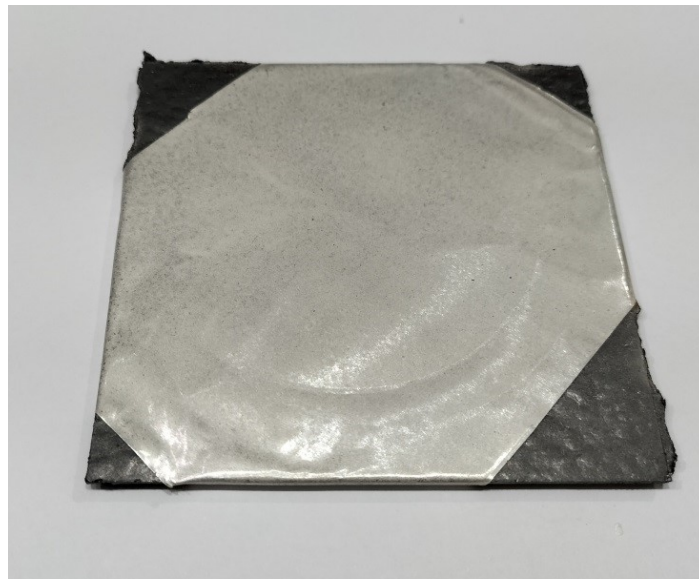


Figure S4. The semi-transparent thin glass layer on aluminium foil.

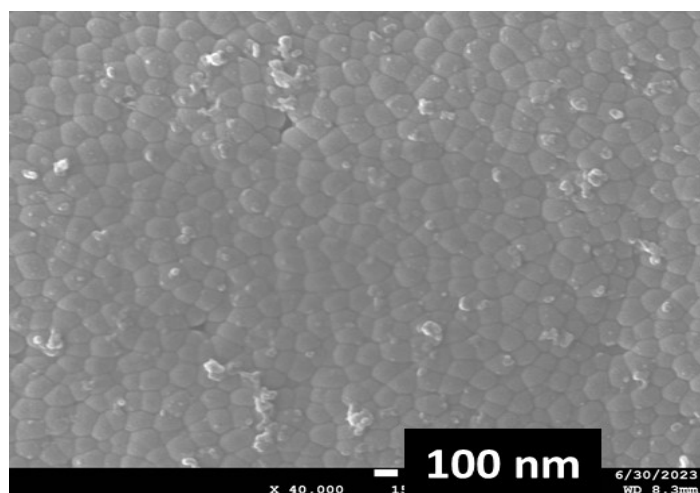


Figure S5. The SEM image of the back sides of AAO. The back side of AAO can only be observed after removing the aluminium substrate. This allows for a clear distinction between the front and back sides of the sample once it has been prepared. The back side is sealed by the barrier layer, while the front side appears entirely porous.

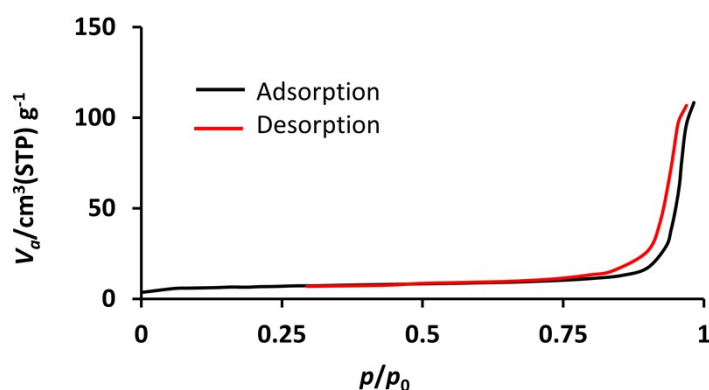


Figure S6. The adsorption-desorption isotherm of AAO. The specific surface area and pore-size distribution were determined using the BELSORP-mini II apparatus. When growing AAO on an aluminium disk, we simultaneously connected a flat aluminium sheet in parallel. After anodization, AAO grew on both sides of the flat aluminium sheet. Initially, 5% NaOH solution was used to dissolve the AAO on one side, exposing the aluminium substrate. Subsequently, a 5% CuCl_2 / 5% HCl solution was employed to dissolve the aluminium substrate, resulting in the formation of an independent AAO film. The AAO film was crushed to fit inside the sample holder and subjected to a 12-hour deaeration process at 160°C . N_2 adsorption-desorption isotherms were then collected at 77 K, and specific surface areas were calculated employing the BET (Brunauer-Emmett-Teller) method based on the N_2 adsorption-desorption isotherms.

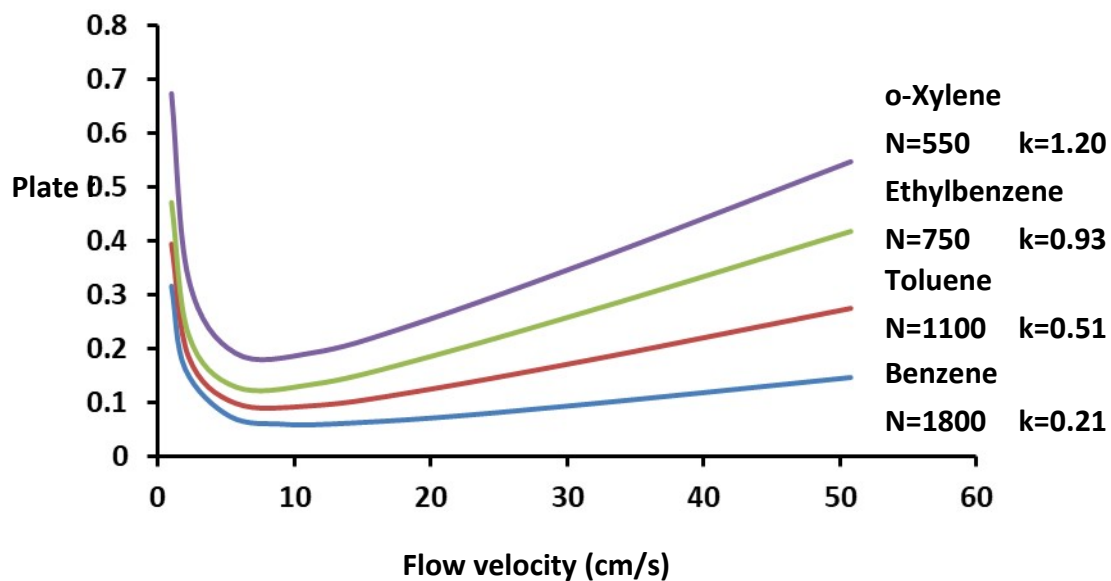


Figure S7. Golay plot fitting for Benzene, Toluene, ethylbenzene, and o-xylene under 175°C using 12 μm oxalic acid AAO column.



Figure S8. The size comparison between the two column disks. The disk below is a first generation column with a diameter of 8.7 cm. Another one on the top is a second generation column with a diameter of 6.2 cm, and the flow channel grooves are also smaller compared to the one below.