

Supporting Information

Investigation of Proton-Driven Amine Functionalized Tube Array as Ion Responsive Biomimetic Nanochannels

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Notes: The authors declare no competing financial interest.

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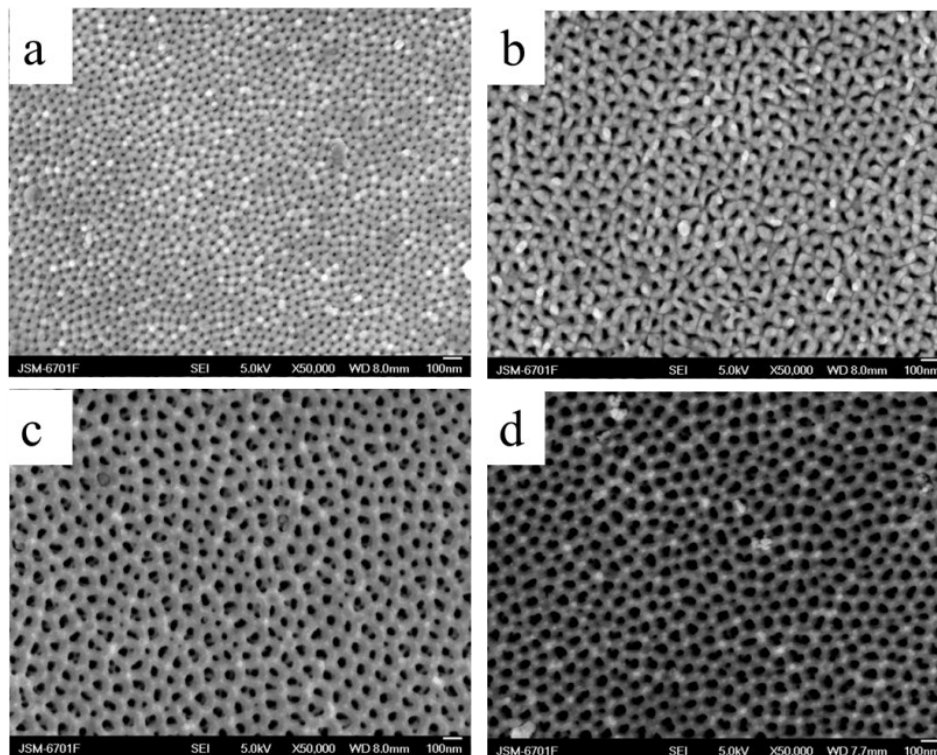


Fig. S1. SEM images of AAO templates after etching in 5wt% H_3PO_4 at 19 °C for different time. a) pores widening for 0 min at 19 °C; b) pores widening for 10 min at 19 °C; c) pores widening for 20 min at 19 °C; d) pores widening for 40 min at 19 °C, respectively. Scale bar: 100 nm.



Fig. S2. Functionalization of the inner walls of AAO nanotube array with APTMS.

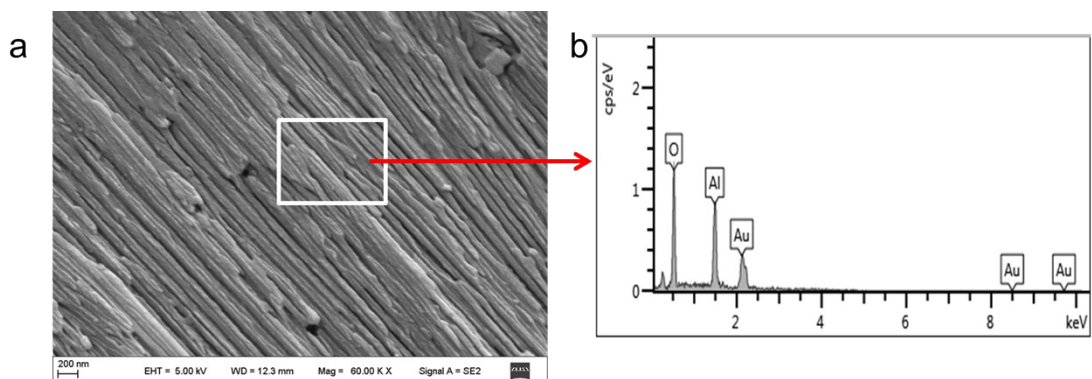


Fig. S3. a) SEM image of cross-section of AAO nanotube array. Bare AAO template with about 30 nm pore diameter was used in study. b) EDS spectrum of cross-section of AAO nanotube array. AAO was sprayed with gold before SEM and EDS analysis.

Table 1. Elements present in AAO were analysed using EDS.

| element | Line style | Apparent concentration | k ratio | wt% | wt% Sigma | Standard sample label |
|---------|------------|------------------------|-------------|-------|-----------|--------------------------------|
| O | K | 138.91 | 0.4674 6 | 48.13 | 1.66 | SiO ₂ |
| Al | K | 94.01 | 0.6752 2 | 51.87 | 1.66 | Al ₂ O ₃ |

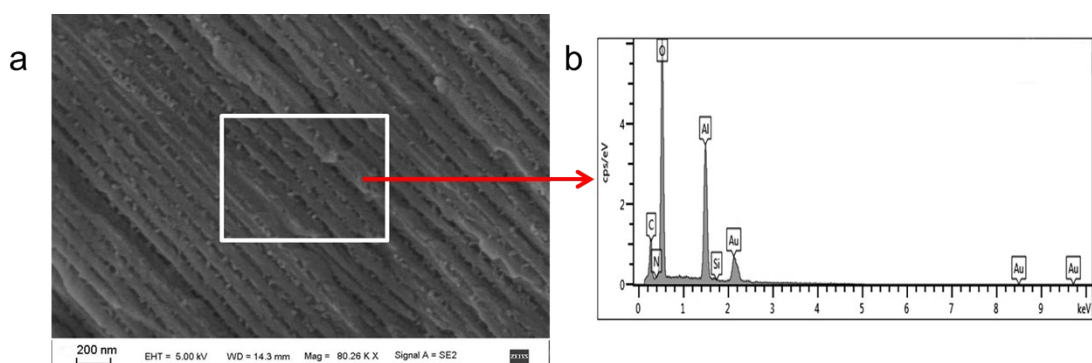


Fig. S4. a) SEM image of cross-section of AAO nanotube array modified with APTMS. Bare AAO template with about 30 nm pore diameter was used in study. b) EDS spectrum of cross-section of AAO nanotube array modified with APTMS. Modified

AAO was sprayed with gold before SEM and EDS analysis.

Table 2. Elements present in APTMS modified AAO were analysed using EDS.

| elements | Line style | Apparent concentration | k ratio | wt% | wt% Sigma | Standard sample label |
|----------|------------|------------------------|---------|-------|-----------|--------------------------------|
| N | K | 2.10 | 0.00374 | 0.21 | 0.27 | BN |
| O | K | 303.78 | 1.02225 | 51.93 | 0.66 | SiO ₂ |
| Al | K | 152.71 | 1.09680 | 47.61 | 0.63 | Al ₂ O ₃ |
| Si | K | 0.71 | 0.00563 | 0.25 | 0.17 | SiO ₂ |