Electronic Supplementary Material (ESI) for Analyst.


**Microfluidic Devices with Templated Regular Macroporous Structures**

**for HIV Viral Capture--Supplementary**

Supplementary I. Capture yield as a function of nanopost aspect ratio

COMSOL simulation was used to study the capture efficiency in 3D hexagonal arrays (Figure S1(A)) with different aspect ratios. The diameter (300nm) and separation of the nanoposts (200nm) were held constant, while the height of the nanoposts were varied to yield aspect ratios of 1, 2, 5 and 10. Twenty particles were injected from the inlet and the fluid inflow velocity was 400 µm/s. The particle, liquid and capture bed properties were set the same way as described in the manuscript. The same capture yield of 70% was observed in all cases (Figure S1(B)). This is a result of separation distance being the characteristic dimension, thus the capture yield is insensitive to the height of the nanoposts.

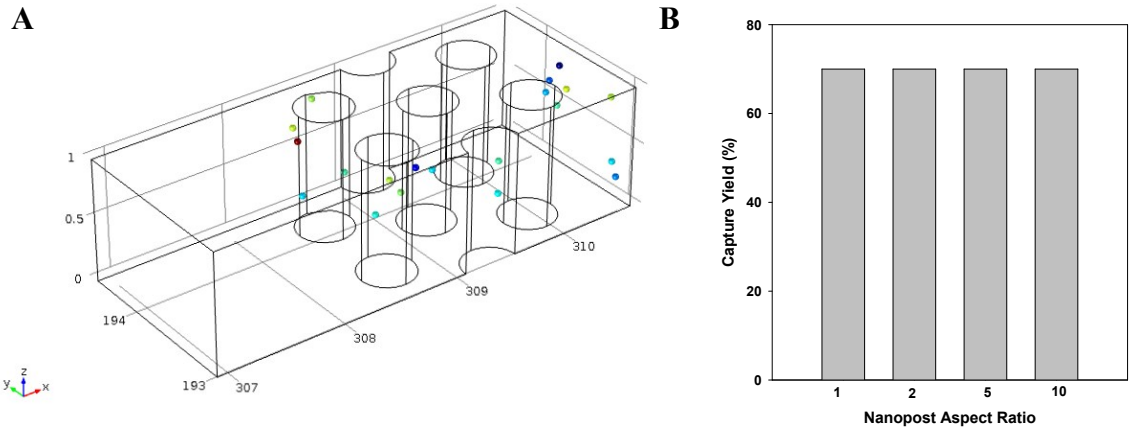


Figure S1. (A) Three dimensional hexagonal arrays of nanoposts were used to study the influence of aspect ratio on capture efficiency by COMSOL simulation. The dots represent distribution of the particles after flowing through the array. (B) 70% of the particles are bound on the posts in all aspect ratios studied.

Supplementary II. Bundling of nanoposts

In the manuscript, the high aspect ratio (~80) nanoposts were fabricated and posts remained mostly upright, due to the support from both ends. Otherwise, the nanoposts are prone to collapsing or clustering on the free end. As seen in Figure S2(A), at an aspect ratio of ~8, the one-end supported nanoposts started to bundle together. With even higher aspect ratio of 15, almost all nanoposts were clustered even with the lyophilization procedure. Therefore, our final procedure attaches the nanoposts on both ends to flat substrates before AAO removal. This enables mostly standing nanoposts with an aspect ratio as high as ~80.

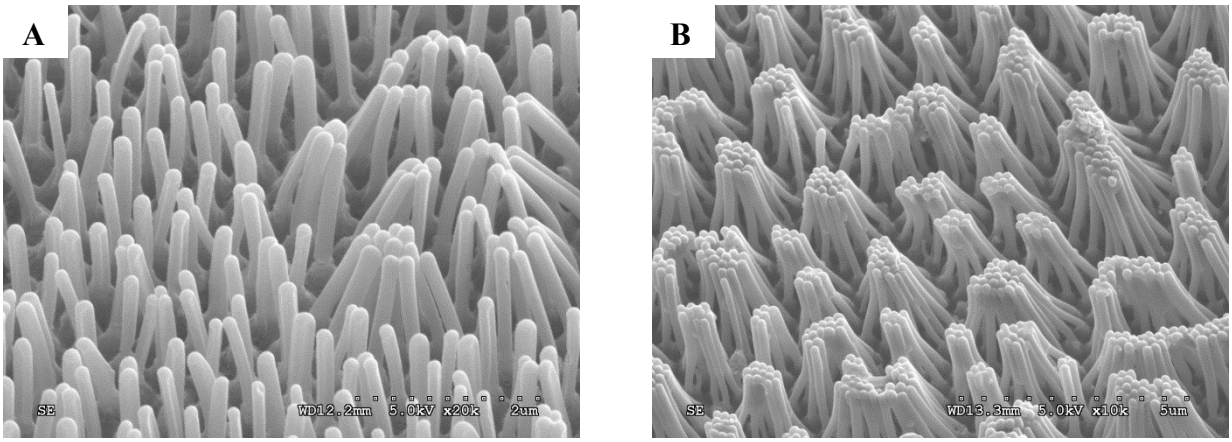


Figure S2. SEM images of PMMA nanoposts with aspect ratios of (A) 8, (B) 15.