

## **Template synthesis and magnetoresistance property of Ni and Co single nanowires electrodeposited into nanopores with a wide range of aspect ratios**

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Nanopores with a wide range of aspect ratios were fabricated in an anodized aluminium oxide layer on bulk metallic aluminium. The aspect ratios ( $L/D$ ) were around 20-1000 (pore length,  $L$ , 1000-60 000 nm; pore diameter,  $D$ , 50-100 nm). For comparison, nanopores in polymer films were also prepared using heavy-ion-track etched polyimide films ( $L$ , 70 000 nm;  $D$ , 70 nm;  $L/D = 1000$ ) and polycarbonate films ( $L$ , 30 000 nm;  $D$ , 100 nm;  $L/D = 300$ ). The pore diameter of the anodized aluminium oxide layer was controlled by the anodization voltage, while the pore diameter of the heavy-ion-tracked polyimide and polycarbonate films was controlled by the etching time in a sodium hydroxide alkaline solution. Ni and Co homogeneous single nanowires were fabricated using the electrodeposition and in situ contacted techniques in the nanoporous templates. The Ni and Co nanowires with the largest aspect ratios ( $L/D = 1000$ ) showed around 2.3% and 1.6% of the typical anisotropic magnetoresistance (AMR), and the effects of aspect ratio on the resistance and AMR were investigated.