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阳极氧化铝模板法可控制备金属纳米线和纳米管阵列的生长机制

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Growth Mechanism for Controlled Synthesis of Metal Nanotube and Nanowire Arrays Using Anodic Aluminum Oxide Templates

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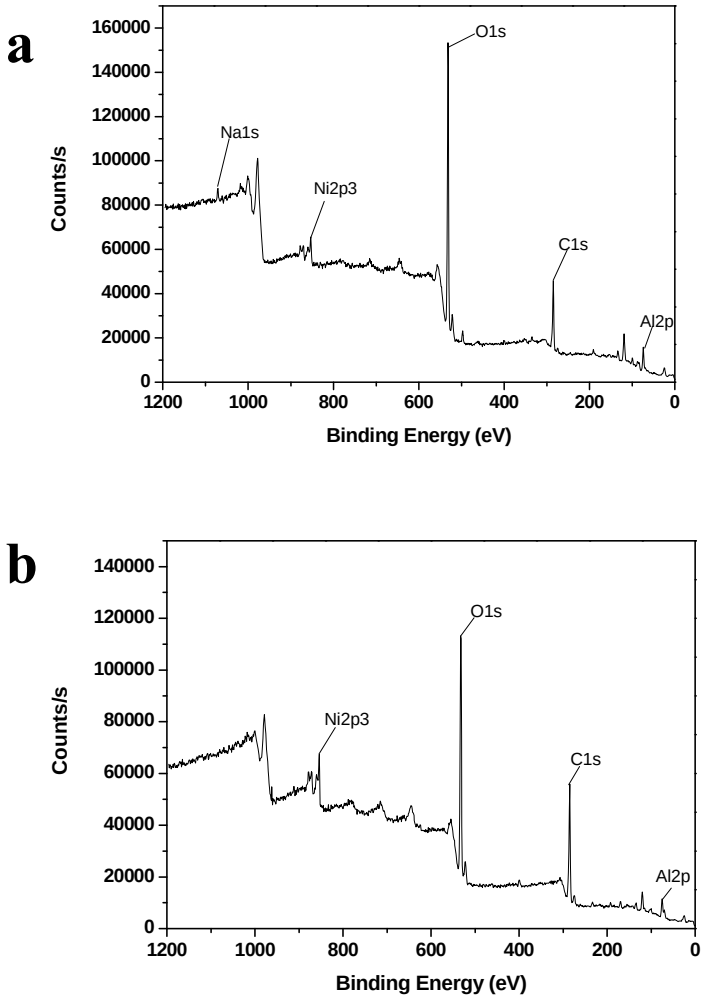

Fig.S1 Full survey XPS spectra for the Ni nanotubes (sample 2) and Ni nanowires (sample 5)

(a) Full survey XPS spectrum of the Ni nanotubes (sample 2). (b) Full survey XPS spectrum for the Ni nanowires (sample 5). The appearance of the Ni 2p3/2 peak in these two spectra demonstrate the existence of the metallic Ni in the Ni nanowires and nanotubes.

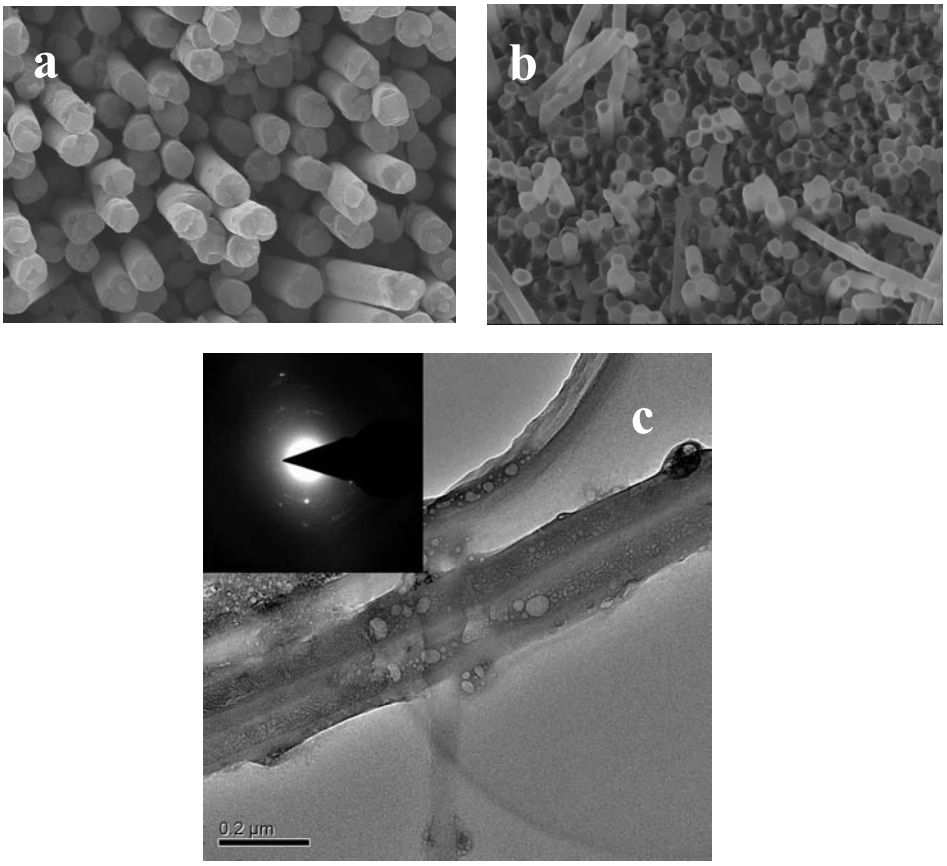

Fig.S2 SEM and TEM images of Cu nanowire and nanotube arrays

(a) Top view of the Cu nanowires deposited from the solution with 0.01 mol•L^{-1} $CuSO_4$ at U_{ed} = -1.2 V. (b) Top view of the Cu nanotubes deposited from the solution with 0.01 mol•L^{-1} $CuSO_4$, 0.02 mol•L^{-1} EDTA and 20 g•L^{-1} K_2HPO_4 at U_{ed} = -1.2 V. (c) TEM image and the corresponding selected area electron diffraction pattern acquired from a 200 nm diameter Cu nanotube with the same electrodeposition conditions in Fig S2b.

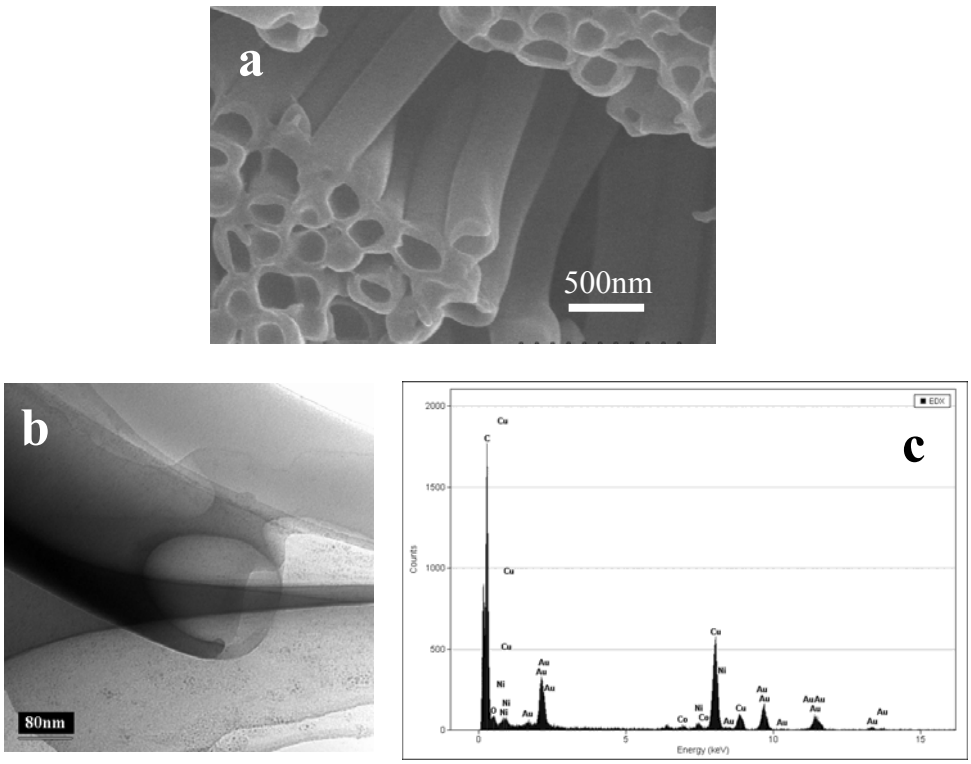

Fig.S3 SEM, TEM images and energy-dispersive X-ray spectroscopy (EDS) of Au nanotube arrays

(a) Top view of the Au nanotubes deposited from the solution with 0.01mol•L^{-1} $HAuCl_4$, 0.01mol•L^{-1} EDTA, 0.05mol•L^{-1} K_2HPO_4, 0.003 mol•L^{-1} $CoSO_4$ at U_{ed} = -1.5 V. [1] (b) TEM image of a 200 nm diameter Au nanotube. (c) The EDS spectrum of the Au nanotubes. All the Au nanotubes are obtained from the same sample.

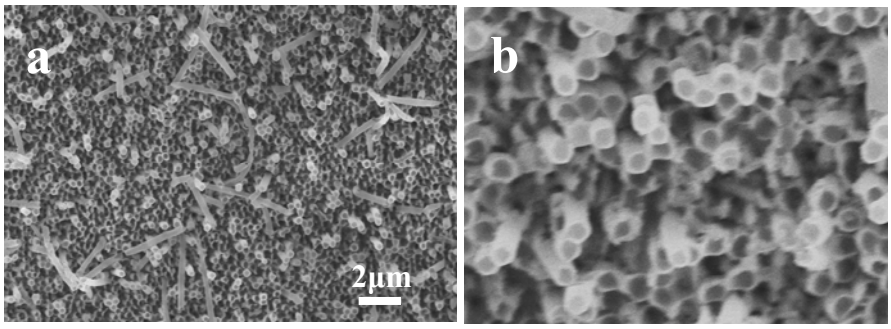

Fig.S4 SEM images of Co nanotube arrays

(a) and (b) are top view of the Co nanotubes deposited from the solution with 0.01 mol•L^{-1} $CoSO_4$, 0.01 mol•L^{-1} EDTA, 0.05 mol•L^{-1} K_2HPO_4 at U_{ed} = -1.2 V.

References

[1] Zhang, X. Y.; Zhang, L. D.; Lei, Y.; Zhao, L. X.; Mao, Y. Q. *J. Mater. Chem.* **2001**, **11**: 1732