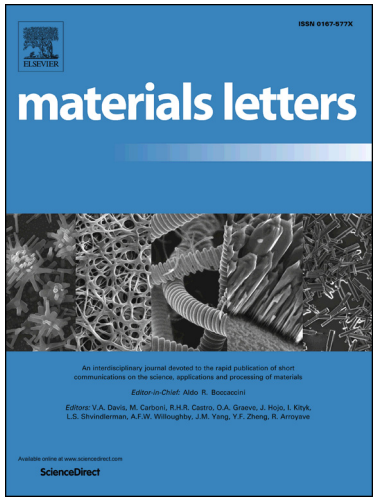

Dual-Templating Approach to Ordered Mesoporous Pt Nanowires with Various Morphologies

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PII: S0167-577X(18)30616-5
DOI: https://doi.org/10.1016/j.matlet.2018.04.030
Reference: MLBLUE 24197

To appear in: *Materials Letters*

Received Date: 12 February 2018
Revised Date: 22 March 2018
Accepted Date: 5 April 2018

Please cite this article as: C. Zhang, J. Chen, L. Xu, Dual-Templating Approach to Ordered Mesoporous Pt Nanowires with Various Morphologies, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.04.030

Dual-Templating Approach to Ordered Mesoporous Pt Nanowires with Various Morphologies

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Abstract

Herein, we report a universal approach for fabricating mesoporous Pt nanowires with controlled mesostructures from a dual template using anodic aluminum oxide (AAO) membrane with silica nanospheres assembled in the channels. The mesoporous Pt nanowires with well-ordered mesopores are successfully prepared by chemical reduction deposition method. In addition, we show a variety of mesopore arrangements in the Pt nanowires (such as linear, zigzag, and meshy topologies) for different values of the *D* (the ratio of the AAO channel (d_1) and silica sphere diameter (d_2)) factor ranging between 1 and $1+\sqrt{2}$ (≈2.414). The present approach is anticipated to work on the preparation of mesoporous nanowires of other metals (e.g., Au, Ni, and Pd) or alloys (e.g., Pt-Ni, and Pt-Ru alloys) with various topologies that may be promising as potential candidates for the next generation nanodevices and other applications (e.g., fuel cells and catalysis).

Keywords Pt nanowire; Porous materials; Ordered mesoporous structure; Dual-templating method; Structural

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