Hydrothermal synthesis of highly oriented hexagonal WO_3 nanowires

°Guozhu Zhang, Chen Wang, Kazuki Nagashima, Tsunaki Takahashi, Masaki Kanai, Yong He and Takeshi Yanagida

IMCE, Kyushu Univ.

E-mail: guo_zhang@cm.kyushu-u.ac.jp

As important device building blocks, one-dimensional (1D) WO_3 nanowires (NWs) have been attracted considerable attentions due to their distinctive physical/chemical properties, making it suitable for application in nanodevices and nanosensors. Among the 1D NWs fabrication approaches, the hydrothermal synthesis method is considered as a promising "soft chemical" process, because this method is able to carefully control the synthesis parameters and perform under a relatively low-temperature. Thus herein, we demonstrate the hydrothermal synthesis of highly oriented hexagonal WO_3 NWs by controlling the amount of sodium sulfate-Na_2SO_4. When increasing the amount of Na_2SO_4, the diameters of the WO_3 NWs were decreased and the length was grown up to 10 micrometers. In addition, the exposed (100) facets of WO_3 NWs were gradually etched with increasing Na_2SO_4, and the cross-sectional shape of the NWs was varied from hexagonal to circular. These results indicate that Na_2SO_4 works as capping agent during WO_3 NWs growth, and therefore plays a crucial role in controlling the macroscopic/microscopic morphologies of the final products.