Electronic Supplementary Material (ESI) for Materials Advances.

Supplementary Information

Template-free formation of oriented oxide nanowalls via topotactic-like pseudomorphic transformation: [110]-MgO(111) nanowall arrays

Tsutomu Shinagawa[a,b]* and Masanobu Izaki[b]

[a] *Electronic Materials Research Division, Morinomiya Centre, Osaka Research Institute of Industrial Science and Technology, Osaka 536-8553, Japan. *E-mail: tshina@orist.jp*

[b] *Graduate School of Engineering, Toyohashi University of Technology, Toyohashi, Aichi 441-8580, Japan.*

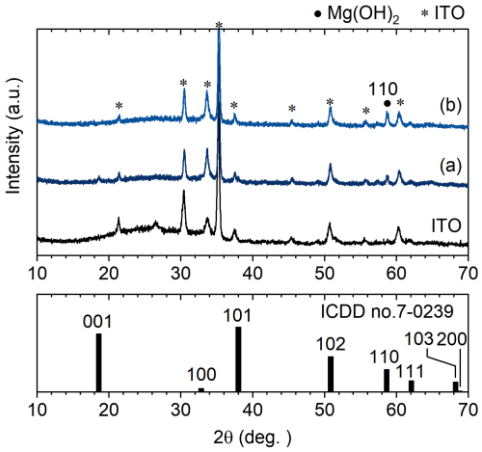

Figure S1. XRD patterns of as-deposited $Mg(OH)_2$ nanowall (NW) arrays electrodeposited on an ITO substrate with controlled grain size: (a) large-grain and (b) small-grain NWs obtained at an initial current density of (a) 0.5 and (b) 4.0 mA cm^{-2} for 40 and 5 s, followed by a constant current of 0.2 mA cm^{-2} for ~4.2 min, respectively.

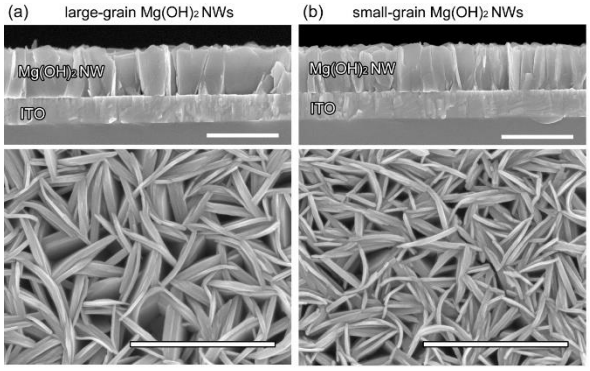

Figure S2. Cross-sectional (top) and surface (bottom) FESEM images of as-deposited $Mg(OH)_2$ nanowall (NW) arrays electrodeposited on an ITO substrate with controlled grain size: (a) large-grain and (b) small-grain NWs obtained at an initial current density of (a) 0.5 and (b) 4.0 mA cm^{-2} for 40 and 5 s, followed by a constant current of 0.2 mA cm^{-2} for ~4.2 min, respectively.

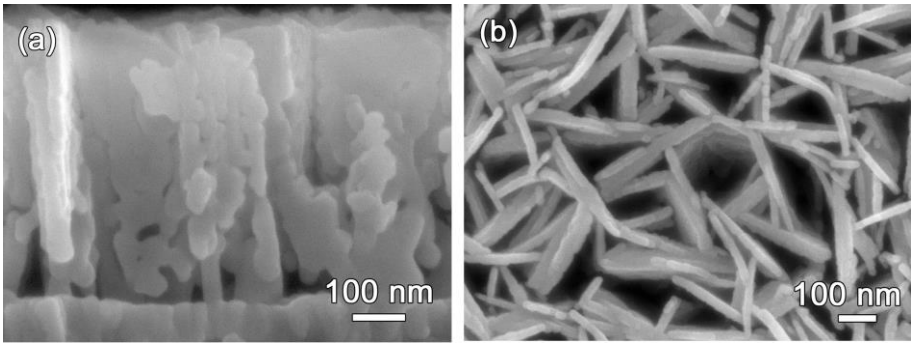

Figure S3. (a) Cross-sectional and (b) surface FESEM images of MgO nanowalls obtained by heating $Mg(OH)_2$ NWs at 800 °C for 2 h in air.

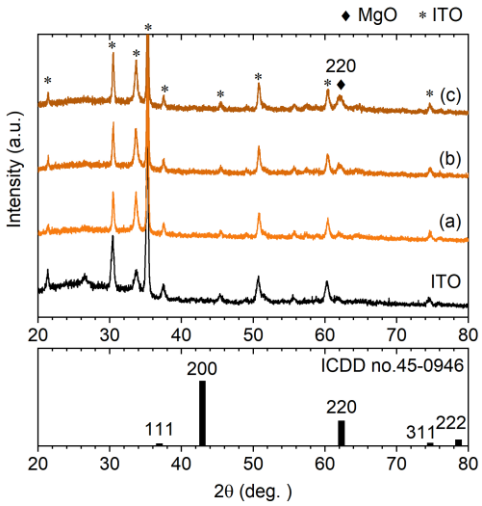

Figure S4. XRD patterns of MgO NWs obtained by heating $Mg(OH)_2$ NWs at 500 °C for 2 h in air: the electrodeposition time of $Mg(OH)_2$ is (a) 1.7, (b) 4.2 and (c) 8.3 min.