Electronic supplementary information (ESI):

Nanoscale semiconductor-insulator-metal core/shell heterostructures: facile synthesis and light emission

Gong Ping Li, Rui Chen, Dong Lai Guo, Han Dong Sun, Tom Wu*

Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore 637371

Lai Mun Wong, Shi Jie Wang

Materials Science and Characterization Cluster, Institute of Materials Research and Engineering, Singapore 11760 (Singapore)
Figure S1. (a) and (b) SEM image of 700 °C annealed ZnO/MgO core/shell NWs. (c) Corresponding low-resolution TEM image of a ZnO/MgO core/shell NW and (d) the SAED pattern. (e) TEM image of the interface showing that MgO layer is polycrystalline and composed of randomly oriented MgO nanocrystals with sizes ranging from 5 to 15 nm. (f) High-resolution TEM image of the MgO shell. The measured interplanar spacing of 0.31 nm matches well with the (511) planes of cubic MgO, indicating that the amorphous MgO is crystallized into MgO nanocrystals during the high temperature annealing.
Figure S2. SEM image of linear SnO$_2$ NPs embedded in MgO NTs formed by annealing SnO$_2$/MgO NWs in H$_2$ (10% in Ar) at 1000 °C for 1 h.
Figure S3. High-resolution TEM image of an individual MgO nanocrystal inside the MgO NTs obtained by dry etching (10%H₂ at 750 °C for 1 h).
**Figure S4.** SEM images of comb-shaped hollow MgO nanostructures formed by post-annealing ZnO nanocomb/ MgO heterostructures in H\(_2\) (10% in Ar) at 750 °C for 1 h.