## **Supplementary Information for**

## TiO<sub>2</sub> nanowire growth driven by phosphorous-doped nanocatalysis

Myung Hwa Kim<sup>1,3,6</sup>, Jeong Min Baik<sup>1,4,6</sup>, Jing-Ping Zhang<sup>2,5</sup>, Christopher Larson<sup>1</sup>, Youli Li<sup>2</sup>, Galen D. Stucky<sup>1,2</sup>, Martin, Moskovits<sup>1</sup>\*, and Alec M. Wodtke<sup>1</sup>\*

<sup>1</sup>Department of Chemistry & Biochemistry, University of California at Santa Barbara, Santa Barbara, CA, 93106, USA.

<sup>2</sup>Department of Materials, University of California at Santa Barbara, Santa Barbara, CA, 93106, USA.

<sup>3</sup>*Current address: Department of Chemistry & Nano Science, Ewha Womans University, Seoul, 120-750, Korea.* 

<sup>4</sup>*Current address: School of Advanced Materials and Systems Engineering, Kumoh National Institute of Technology, Gumi Gyungbuk, 730-701, Korea.* 

<sup>5</sup>*Current address: Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215125, China.* 

<sup>6</sup>*These authors contributed equally to this work.* 

\*To whom correspondences should be addressed. Email: <u>mmoskovits@ltsc.ucsb.edu</u>, <u>wodtke@chem.ucsb.edu</u>

Figure 1S. Energy-dispersive X-ray spectroscopy (EDXS) line-scan across the interface of the  $TiO_2$  nanowire and Ni catalyst particle. The head particle is composed of solid Ni. It has a thin amorphous  $TiO_x$  film surrounding it. Only Ti and O are found in the nanowire.





**Figure 2S. The phase diagram of Ni-P binary system.** (The figure was adapted from ref.1)

Figure S3. TEM images of the head parts of nanowires in various diameters. A thin layer of  $TiO_x$  can clearly be seen.



## Reference

1. Schmetterer, C.; Vizdal, J.; Ipser, H. Intermetallics, 2009, 17, 826.