Supporting Information

Simple and scalable synthesis of vertically-aligned anatase nanowires for enhanced photoelectrochemical performance

Kevin Reilly, Baizeng Fang, Fariborz Taghipour,* and David P. Wilkinson*

Department of Chemical and Biological Engineering, University of British Columbia, 2360 East Mall, Vancouver, British Columbia V6T 1Z3, Canada

Corresponding Authors: dwilkinson@chbe.ubc.ca (D. Wilkinson)
fariborz.taghipour@ubc.ca (F. Taghipour)

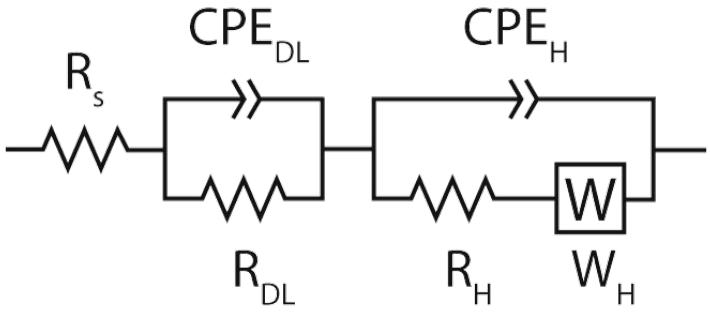

Figure S1 Equivalent circuit used for modeling the photoanode in a 3-electrode configuration.

In this model, R_s is the series resistance of the cell, CPE_{DL} and R_{DL} are the capacitance and depletion layer resistance, respectively. The Helmholtz layer is represented by CPE_H and R_H, the Helmholtz layer capacitance and charge transfer resistance, respectively, and a Warburg diffusion resistance, W_H.

Table S1 The corresponding fitting parameters obtained for the various photoanodes under dark conditions at 0.4 V vs RHE.

	R_s (Ω)	R_{DL} (Ω)	CPE_{DL} (F)	n_{DL}	R_H (Ω)	W_H ($\Omega s^{-1/2}$)	CPE_H (F)	n_H
CBD-A	19.06	2.10×10^5	5.05×10^{-4}	0.95	622.7	4533	2.53×10^{-5}	0.92
HTV	16.43	2.31×10^5	4.77×10^{-5}	1.00	1855.8	6250	2.20×10^{-5}	0.93
P25	21.43	3.39×10^5	5.54×10^{-5}	1.00	1230.1	1792	2.73×10^{-5}	0.91

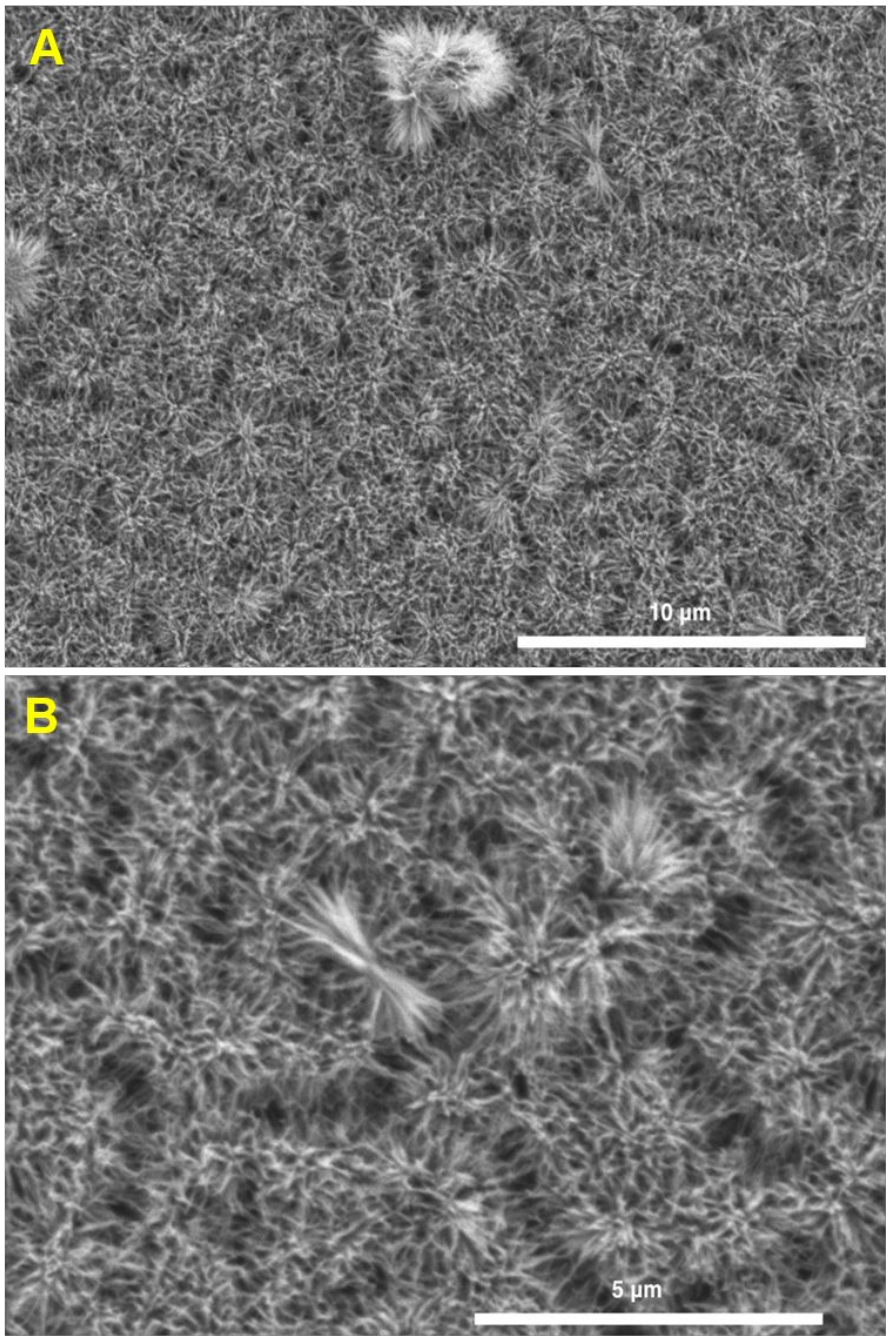

Figure S2 Low-magnification top-view SEM images (A, B) of the nanowires grown in peroxotitanium solution containing 0.31M HNO_3 (CBD-N).

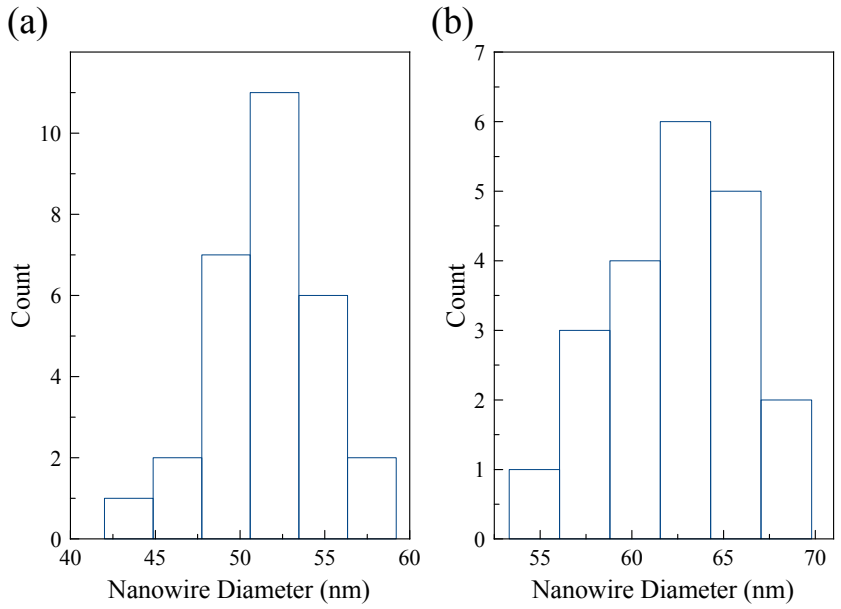

Figure S3 Nanowire diameter size distributions for a) CBD-A and b) CBD-N.

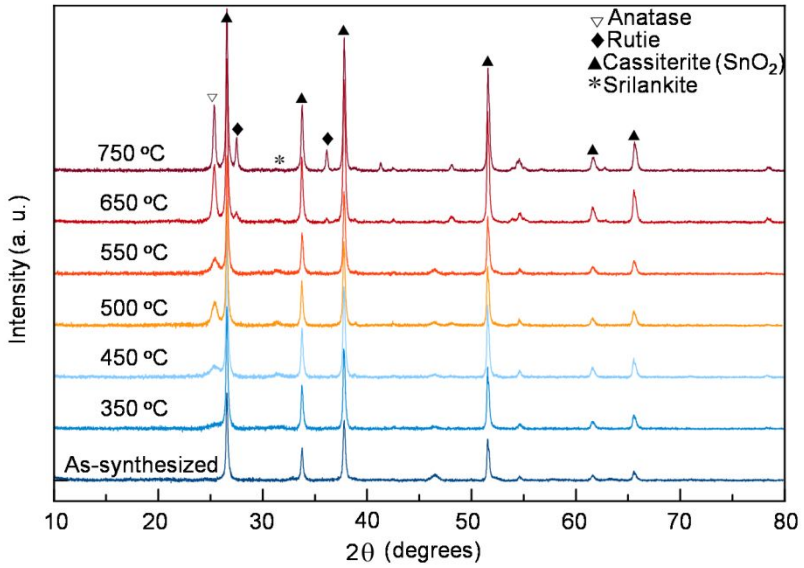

Figure S4 XRD patterns of CBD-N nanowires calcined at temperatures ranging from 350 °C to 750 °C.

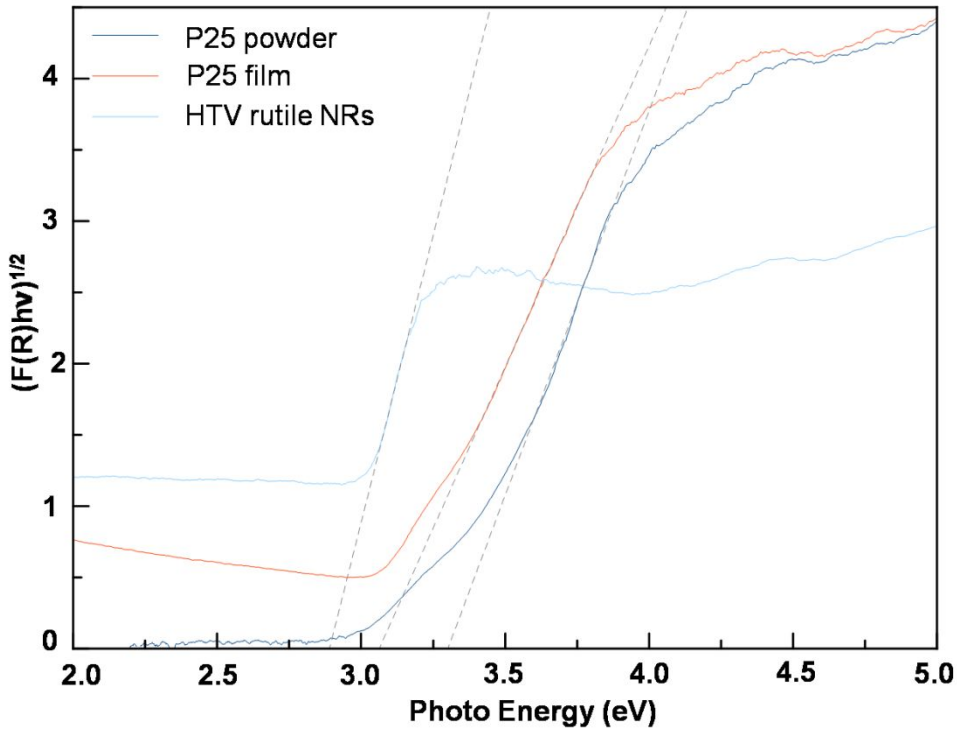

Figure S5 Tauc plots for HTV rutile nanorods, deposited P25 film and pristine P25 powder.

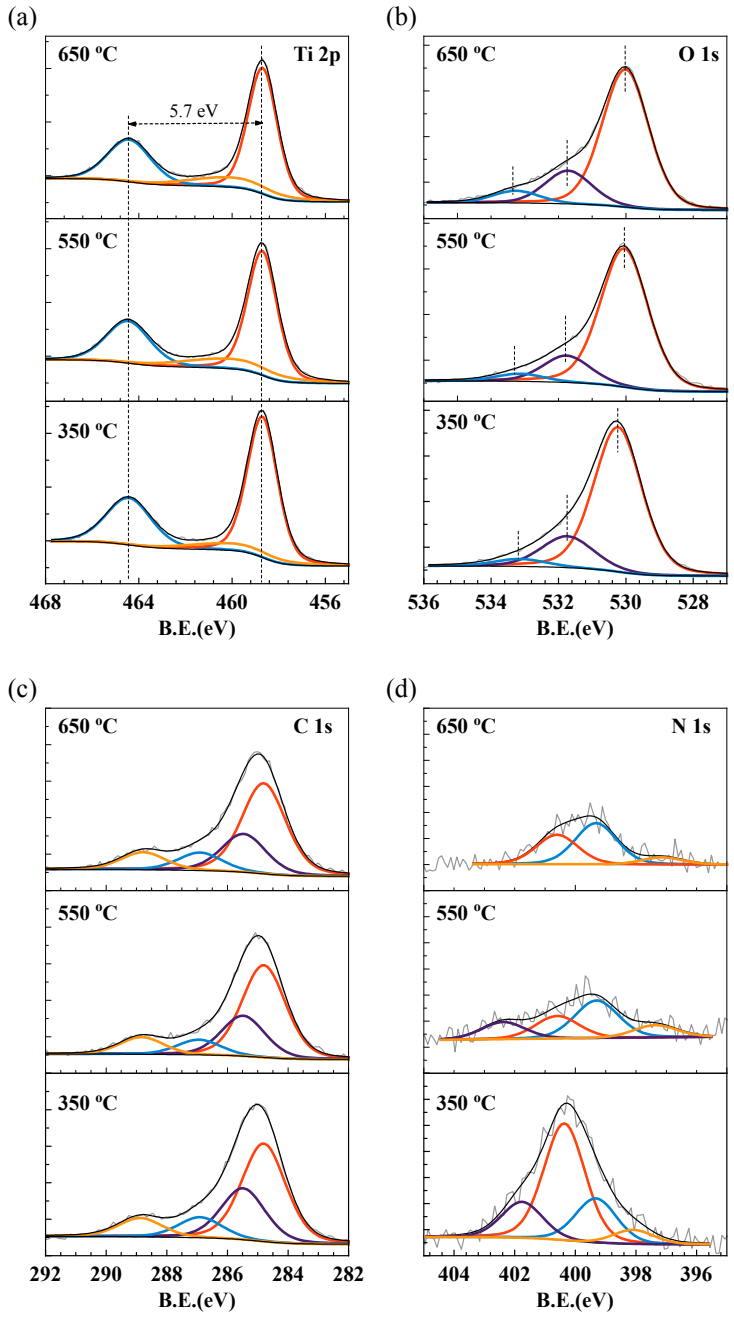

Figure S6 High resolution XPS spectra for a) Ti 2p, b) O 1s, c) C 1s, and d) N 1s.

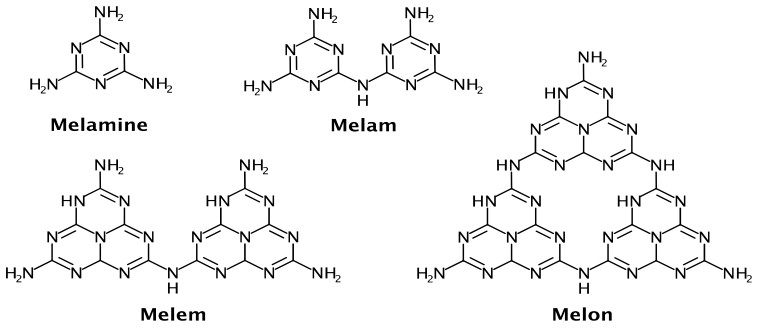

Figure S7 Chemical structures of melamine and its condensation products: melam, melem and melon.