Electronic Supplementary Information for

Urea-glass Preparation of Titanium Niobium Nitrides and Subsequent Oxidation to Photoactive Titanium Niobium Oxynitrides

James J. Brancho, Aaron D. Proctor, Shobhana Panuganti, and Bart M. Bartlett*

Department of Chemistry
University of Michigan
930 N. University Avenue
Ann Arbor, MI 48109-1055, United States
Email: bartmb@umich.edu

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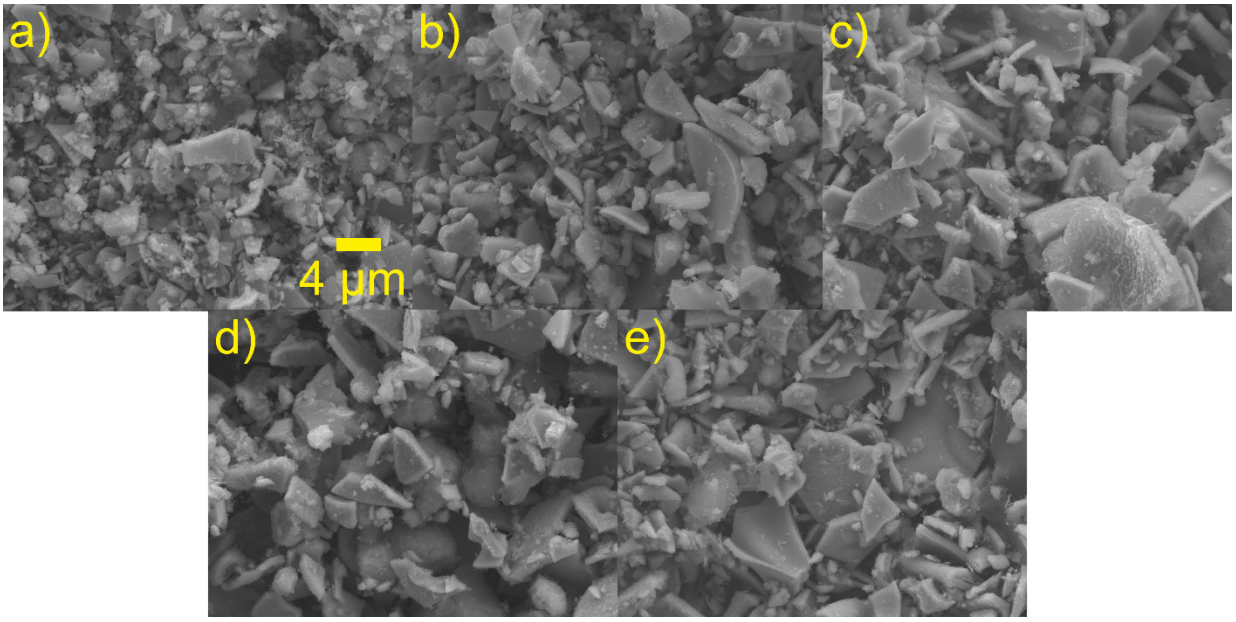

Figure S1. Scanning electron micrographs of $Ti_{1-x}Nb_xN$ prepared by the urea-glass route: a) $x = 0$, b) $x = 0.05$, c) $x = 0.15$, d) $x = 0.25$, e) $x = 0.30$. Each sample shares a common scale bar.

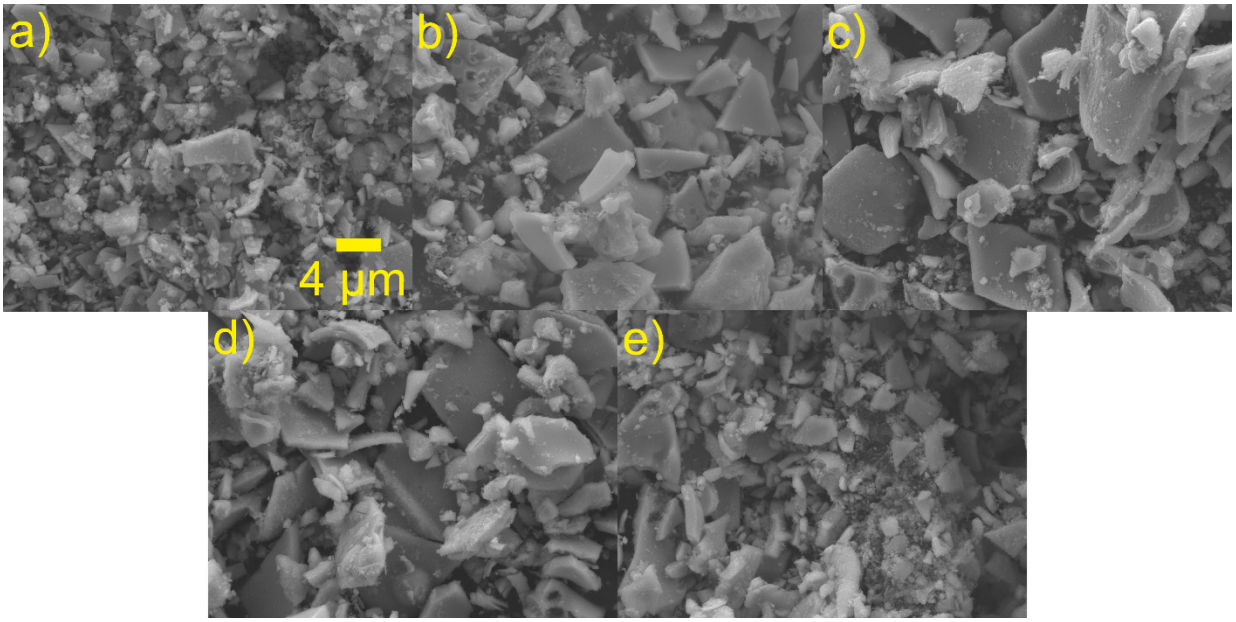

Figure S2. Scanning electron micrographs of $Ti_{1-x}Nb_xN$ prepared by the urea-glass route: a) $x = 0$, b) $x = 0.05$, c) $x = 0.15$, d) $x = 0.25$, e) $x = 0.30$. Each sample shares a common scale bar.

Table S1. Metal contents for $Ti_{1-x}Nb_xN$ found by energy dispersive X-ray spectroscopy.

x	0	0.05	0.15	0.25	0.30
Found Ti:Nb	Ti_1Nb_0	$Ti_{0.92}Nb_{0.08}$	$Ti_{0.82}Nb_{0.18}$	$Ti_{0.77}Nb_{0.23}$	$Ti_{0.69}Nb_{0.31}$

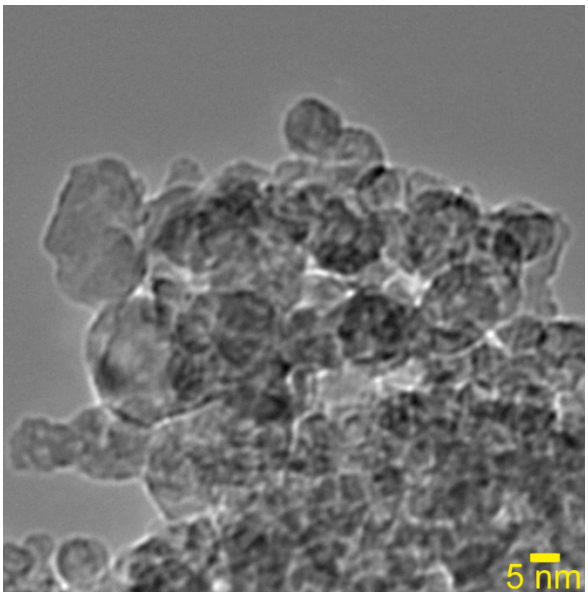

Figure S3. Transmission electron micrograph for TiNbON-0.05.

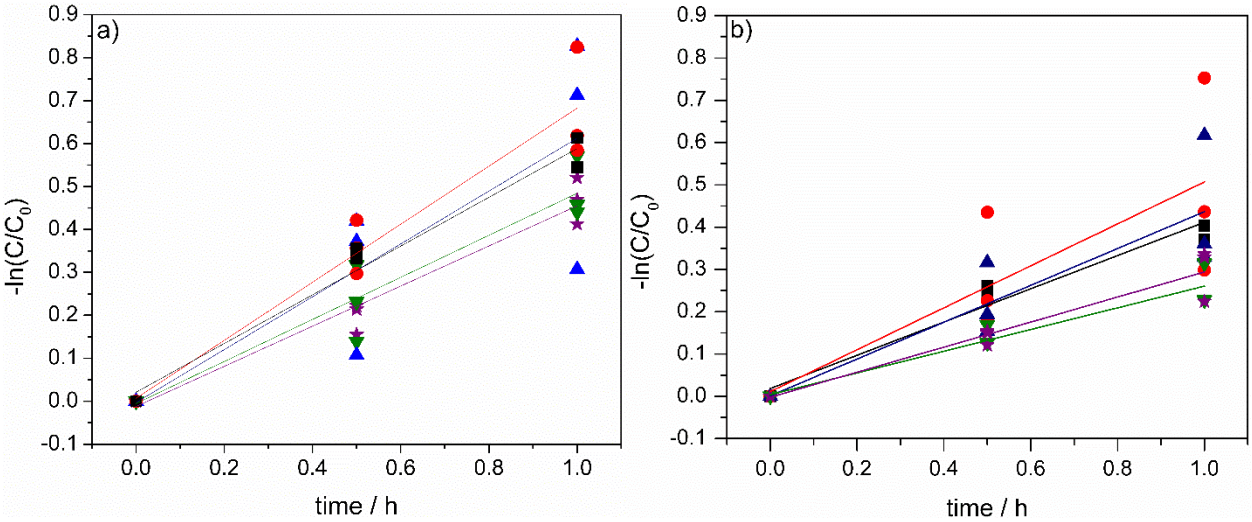

Figure S4. Linear fits for first-order Langmuir-Hinshelwood kinetics for a) full-spectrum and b) $\lambda \geq 400$ nm methylene blue degradation measurements. The slope of the fit line is the rate constant for the reaction. Black squares: TiNbON-0; red circles: TiNbON-0.05; blue up-triangles: TiNbON-0.15; green down-triangles: TiNbON-0.25; purple stars: TiNbON-0.30.

Table S2. First-order Langmuir-Hinshelwood rate constants for methylene blue degradation over TiNbON-X compounds.

	TiNbON-0	TiNbON-0.05	TiNbON-0.15	TiNbON-0.25	TiNbON-0.30
k_{LH} (h^{-1}) full spectrum	0.568 ± 0.033	0.676 ± 0.064	0.615 ± 0.090	0.490 ± 0.050	0.467 ± 0.033
k_{LH} (h^{-1}) $\lambda \geq 400$ nm	0.393 ± 0.026	0.496 ± 0.118	0.435 ± 0.078	0.257 ± 0.025	0.296 ± 0.029

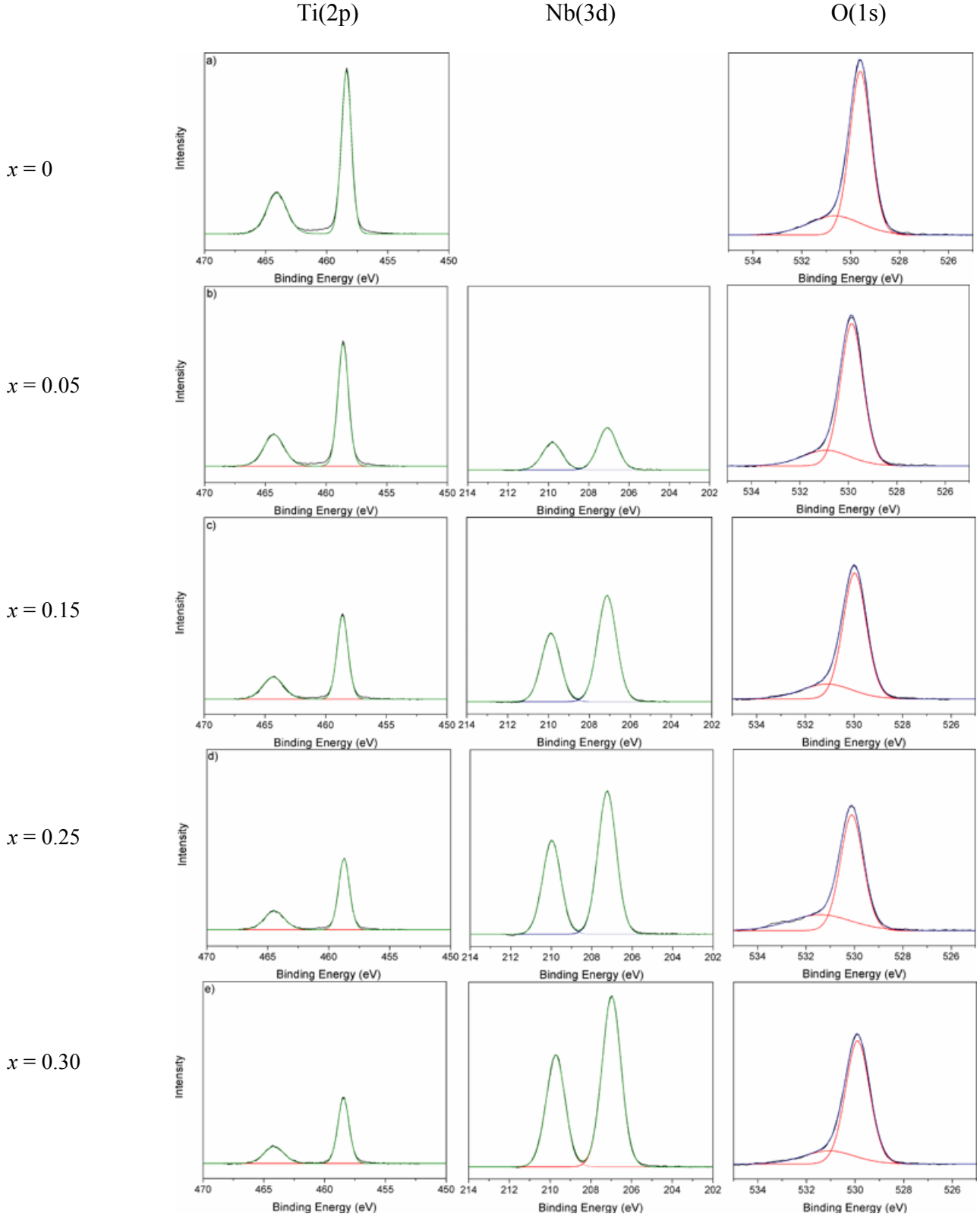

Figure S5 (next). X-ray photoelectron spectra for Ti(2p) (left), Nb(3d) (middle), and O(1s) (right) for TiNbON compounds. Nb content decreases from top to bottom (a), TiNbON-0; b), TiNbON-0.05; c) TiNbON-0.15; d), TiNbON-0.25; e), TiNbON-0.30).