

Supporting Information for:

Evaluation of Lithium Ion Insertion Reactivity via Electrochromic Diffraction-Based Imaging

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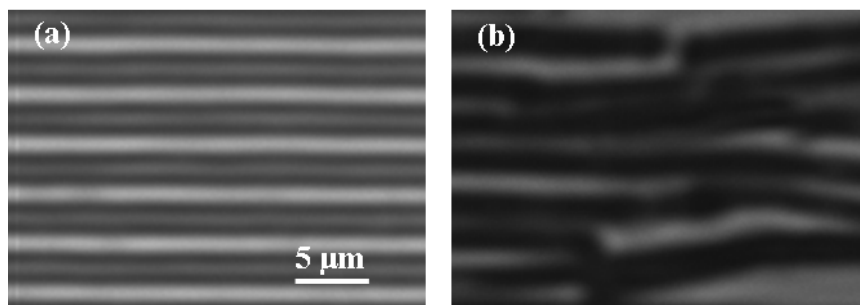


Figure S1. Digital images of a MoO₃ grating (a) before and (b) after Li⁺ insertion via cyclic voltammetry for a potential sweep from +0.2 V to -0.8 V. The grating is supported on ITO and immersed in 1 M LiClO₄/PC.

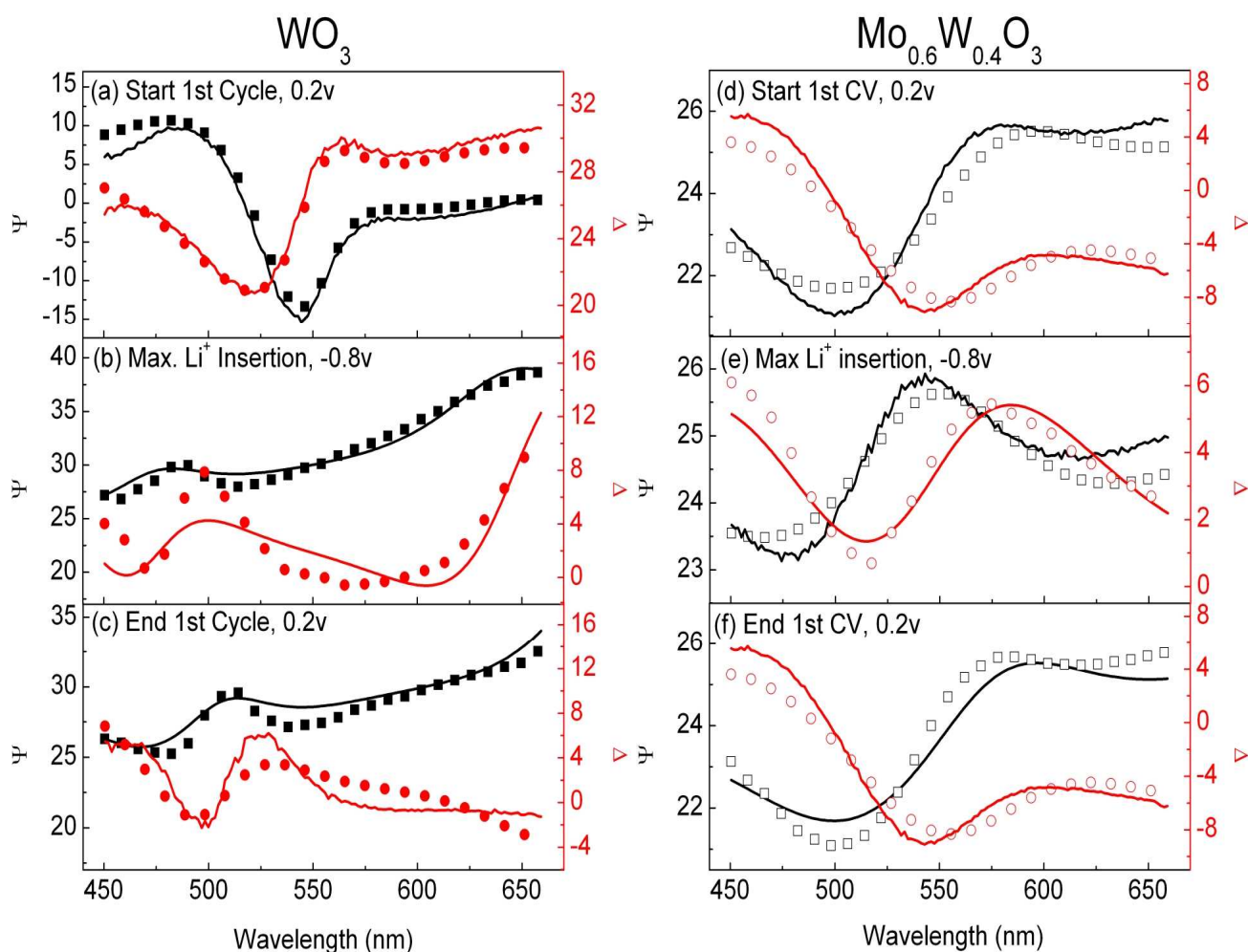


Figure S2. Representative Ψ (squares) and Δ (circles) Drude model fits to experimental data (lines) obtained for WO_3 (solid) and $\text{Mo}_{0.6}\text{W}_{0.4}\text{O}_3$ (hollow) during Li^+ insertion. Li^+ is cycled into and out of the films by modulating the applied potential while Ψ and Δ are monitored with SE. Uncolored films prior to Li^+ intercalation are shown in (a) and (d), fully colored films are shown in (b) and (e), while (c) and (f) are at the end of the cycle but are lightly colored due to irreversible intercalation. Similar fits were achieved between these points and for subsequent cycles.

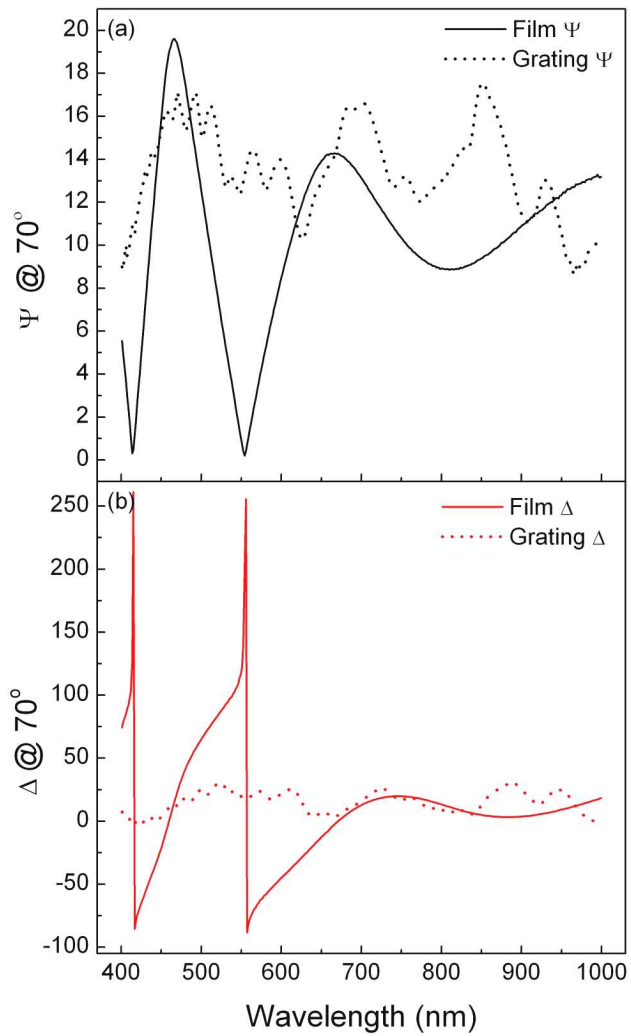


Figure S3. Ellipsometry parameters Ψ (a) and Δ (b) taken at 70° on a thin film of WO_3 (solid) and a patterned WO_3 grating (dotted), both samples were ~ 120 nm. The patterning of the film makes interpreting the ellipsometric data difficult by truncating the spectral feature size (an extreme example of the effect seen on films of uneven thickness) and introducing additional interference fringing.

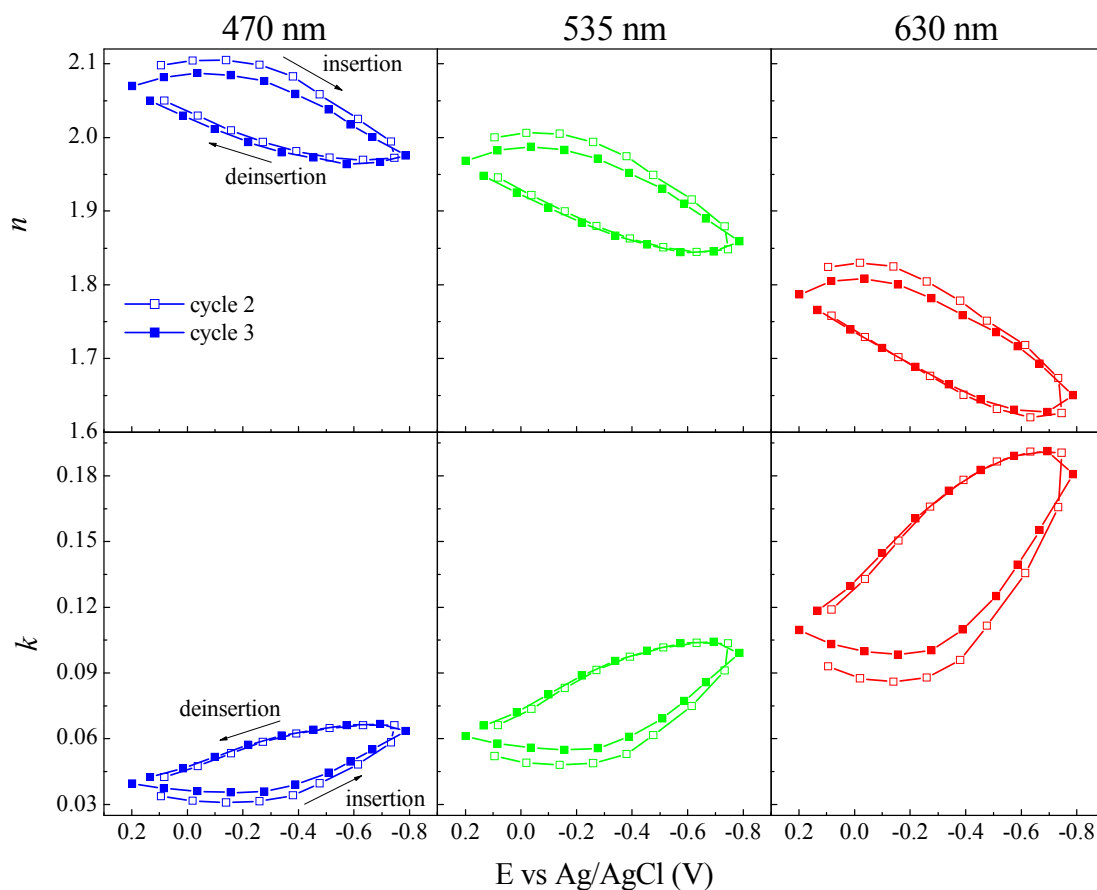


Figure S4. Plots of real, n , and imaginary, k , components of the refractive index as a function of applied potential during the second and third consecutive cycles of Li^+ insertion/deinsertion into WO_3 thin films via cyclic voltammetry, shown at blue (470 nm), green (535 nm) and red (630 nm) wavelengths determined from SE measurements.

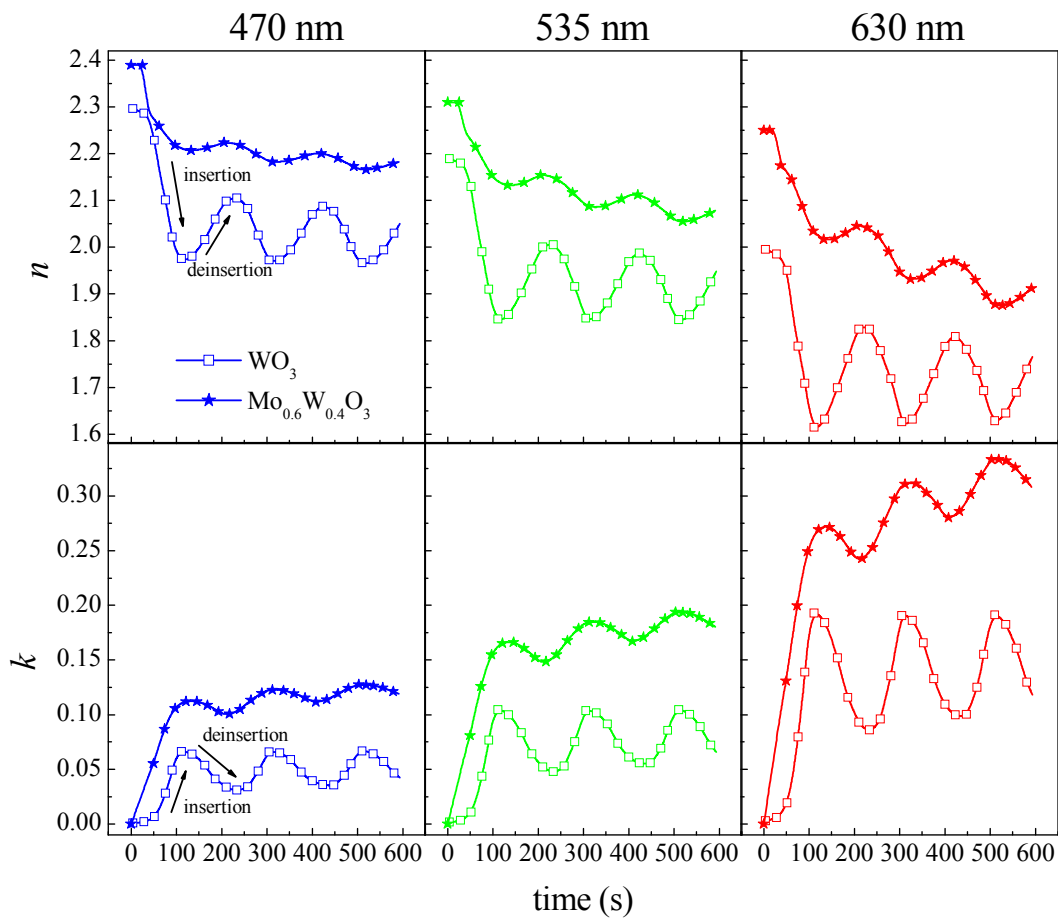


Figure S5. Plots of real, n , and imaginary, k , components of refractive index as a function of time during three consecutive cycles of Li^+ insertion/deinsertion into WO_3 and $\text{Mo}_{0.6}\text{W}_{0.4}\text{O}_3$ thin films via cyclic voltammetry at a scan rate of 10 mV/s, shown at blue (470 nm), green (535 nm) and red (630 nm) wavelengths determined from SE measurements.

Table S1. Summary of the Fit Parameters Determined by Fitting to Diffraction Efficiency Data Obtained During Chronoamperometry Experiments

Insertion Steps	F_t	Γ_t	$n_t(\infty)$	F_Δ	Γ_Δ	$n_\Delta(\infty)$
1	32.00	0.198	2.133	40.25	0.154	3.711
2	9.824	0.236	1.269	34.47	0.110	4.574
3	5.362	2.185	1.000	37.37	0.284	3.343