Supplemental Information

Gradient Polarity Solvent Wash for Separation and Analysis of Electrolyte Decomposition Products on Electrode Surfaces

Chen Fang¹, Zhimeng Liu¹, Jonathan Lau¹, Mahmoud Elzouka¹, Guangzhao Zhang¹, Piyachai Khomein⁵, Sean Lubner¹, Philip N. Ross², Gao Liu¹,²

¹Energy Storage and Distributed Resources Division and ²Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, United States

²Corresponding Author E-mail Address: gliu@lbl.gov
**Figure S1.** FTIR spectra of Cu electrodes cycled at 0.0167 mV s\(^{-1}\) (1 mV min\(^{-1}\)) rate with a) base, b) LMA and c) TEGMA electrolytes. (I) before wash; (II) after 0\% EA/Hex wash; (III) after 10\% EA/Hex wash; (IV) after 20\% EA/Hex wash; (V) after 30\% EA/Hex wash; (VI) after 40\% EA/Hex wash; (VII) after 50\% EA/Hex wash; (VIII) after 60\% EA/Hex wash; (IX) after 70\% EA/Hex wash; (X) after 80\% EA/Hex wash; (XI) after 90\% EA/Hex wash; (XII) after 100\% EA/Hex wash; (XIII) synthetic standards of b) poly-LMA and c) poly-TEGMA.
Figure S2. FTIR spectra of Cu electrodes cycled at 0.167 mV s⁻¹ (10 mV min⁻¹) rate with a) base, b) LMA and c) TEGMA electrolytes. (I) before wash; (II) after 0% EA/Hex wash; (III) after 10% EA/Hex wash; (IV) after 20% EA/Hex wash; (V) after 30% EA/Hex wash; (VI) after 40% EA/Hex wash; (VII) after 50% EA/Hex wash; (VIII) after 60% EA/Hex wash; (IX) after 70% EA/Hex wash; (X) after 80% EA/Hex wash; (XI) after 90% EA/Hex wash; (XII) after 100% EA/Hex wash; (XIII) synthetic standards of b) poly-LMA and c) poly-TEGMA.
**Figure S3.** FTIR spectra of Cu electrodes cycled at 1 mV s\(^{-1}\) (60 mV min\(^{-1}\)) rate with a) base, b) LMA and c) TEGMA electrolytes. (I) before wash; (II) after 0% EA/Hex wash; (III) after 10% EA/Hex wash; (IV) synthetic standard poly-LMA in b) and after 20% EA/Hex wash in c); (V) after 30% EA/Hex wash; (VI) after 40% EA/Hex wash; (VII) after 50% EA/Hex wash; (VIII) after 60% EA/Hex wash; (IX) after 70% EA/Hex wash; (X) after 80% EA/Hex wash; (XI) after 90% EA/Hex wash; (XII) after 100% EA/Hex wash; (XIII) synthetic standard poly-TEGMA.
Figure S4. FTIR spectra of Si electrodes cycled with a) base, b) LMA and c) TEGMA electrolytes. (I) before wash; (II) after 0% EA/Hex wash; (III) after 10% EA/Hex wash; (IV) after 20% EA/Hex wash; (V) after 30% EA/Hex wash; (VI) after 40% EA/Hex wash; (VII) after 50% EA/Hex wash; (VIII) after 60% EA/Hex wash; (IX) after 70% EA/Hex wash; (X) after 80% EA/Hex wash; (XI) after 90% EA/Hex wash; (XII) after 100% EA/Hex wash; (XIII) synthetic standards of b) poly-LMA and c) poly-TEGMA.