Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electronic Supplementary Information (ESI)

Suppressing the effect of lithium dendritic growth by the addition of magnesium bis(trifluoromethanesulfonyl)amide

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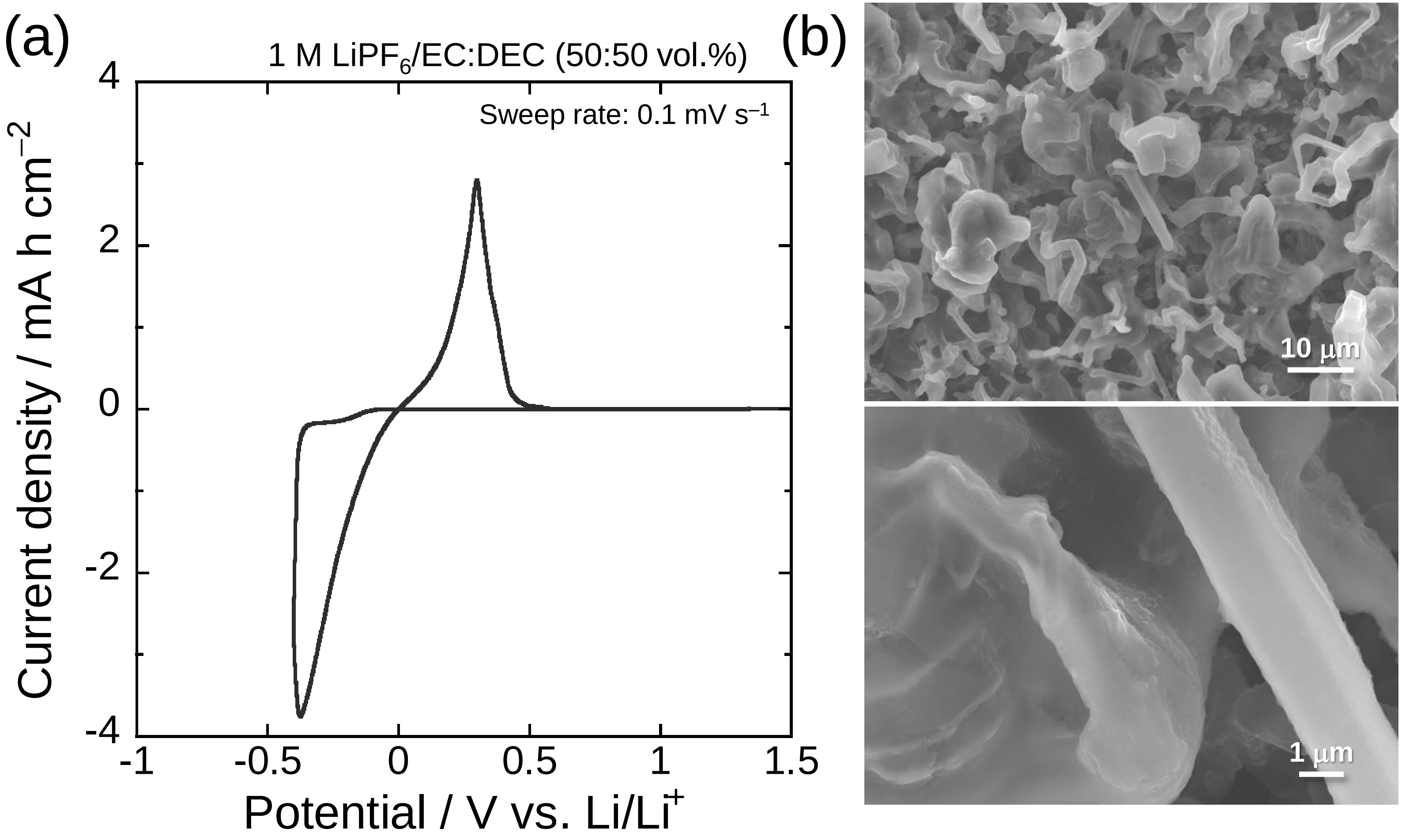

Figure S1. (a) CV profile of Li-deposition/dissolution behavior on a Cu substrate in a commercial electrolyte of 1 M LiPF$_6$/EC:DEC (50:50 vol.%) at a sweep rate of 0.1 mV s$^{–1}$. (b) FE-SEM images of deposited Li at a constant potential of –0.4 V vs. Li/Li$^+$ for 10 h.

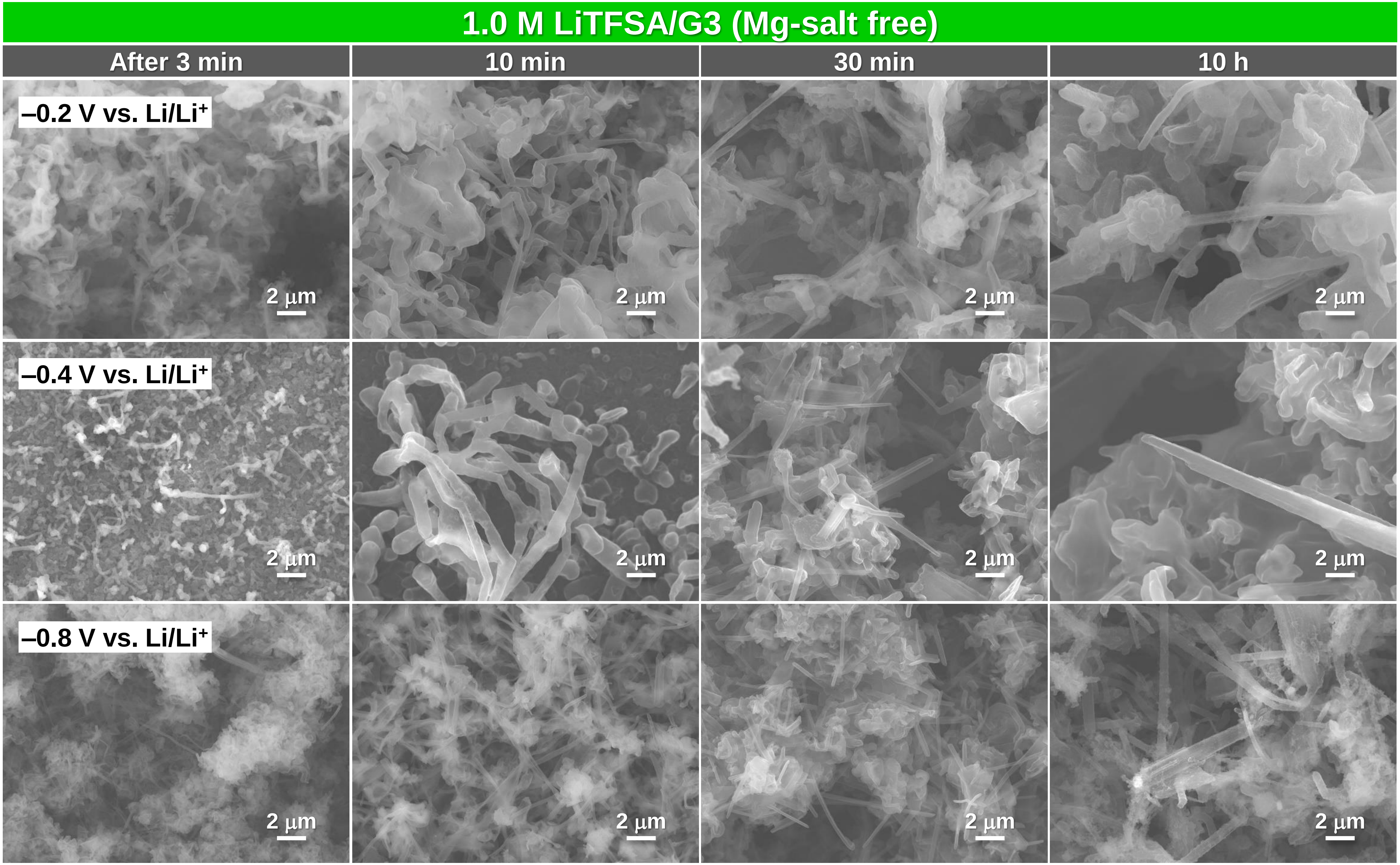

Figure S2. Enlarged views of FE-SEM images for deposits obtained from 1.0 M LiTFSA/G3 at various potentials: –0.2 V, –0.4 V, and –0.8 V vs. Li/Li^+.

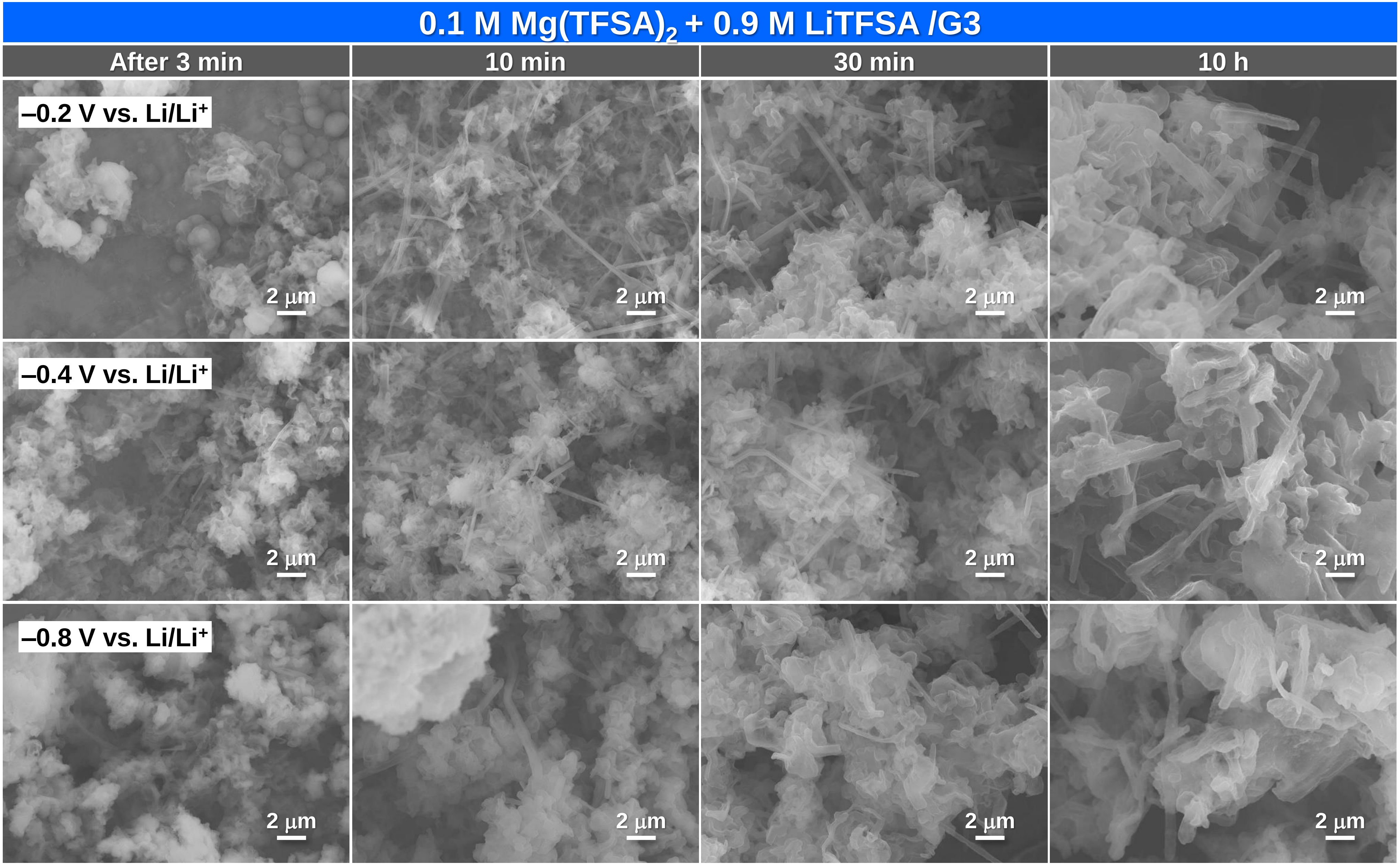

Figure S3. Enlarged views of FE-SEM images for deposits obtained from 0.1 M $Mg(TFSA)_2$ + 0.9 M LiTFSA/G3: at various potentials vs. Li/Li^+.

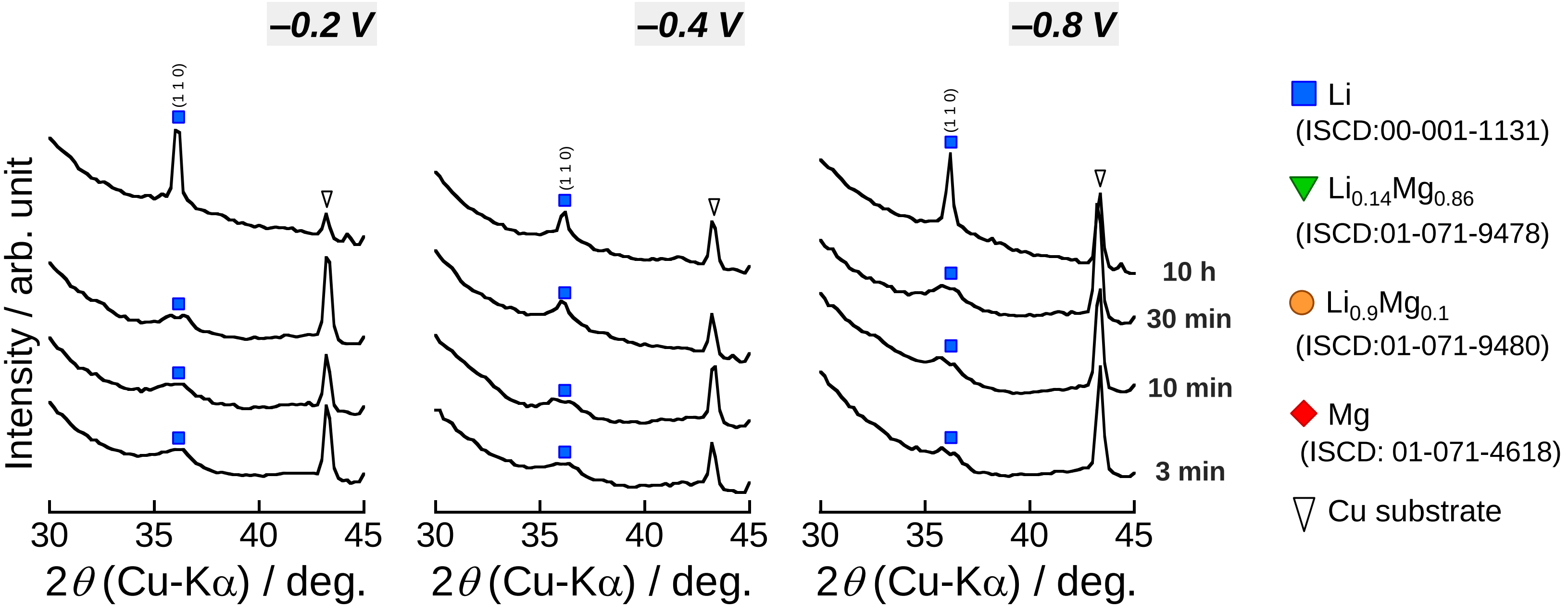

Figure S4. XRD patterns of deposits electrochemically grown on a Cu substrate in electrolytes of 0.1 M $Mg(TFSA)_2$ + 0.9 M LiTFSA/G3 at each time under various constant potential.

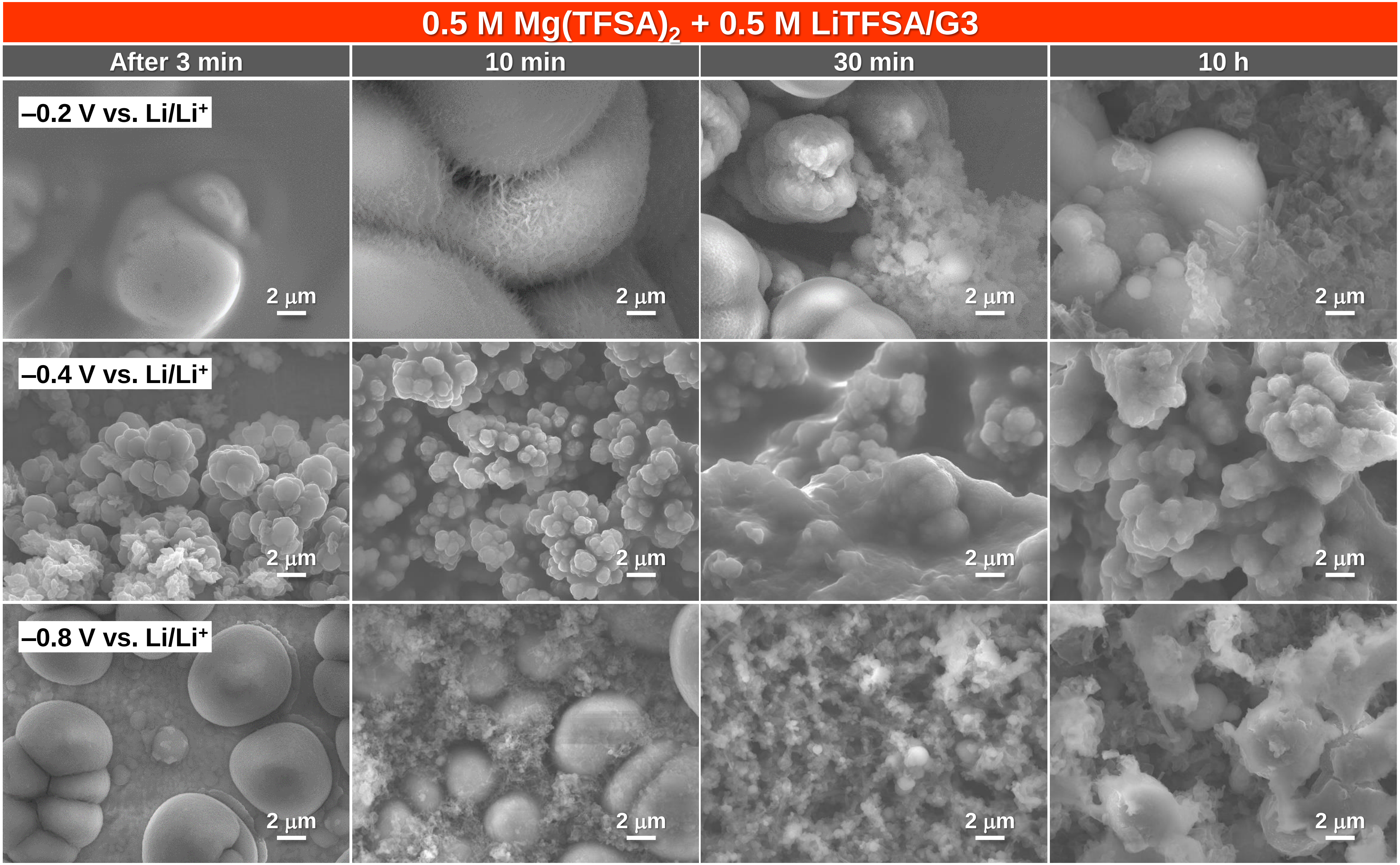

Figure S5. Enlarged views of FE-SEM images for deposits obtained from 0.5 M $Mg(TFSA)_2$ + 0.5 M LiTFSA/G3 at various potentials vs. Li/Li^+.

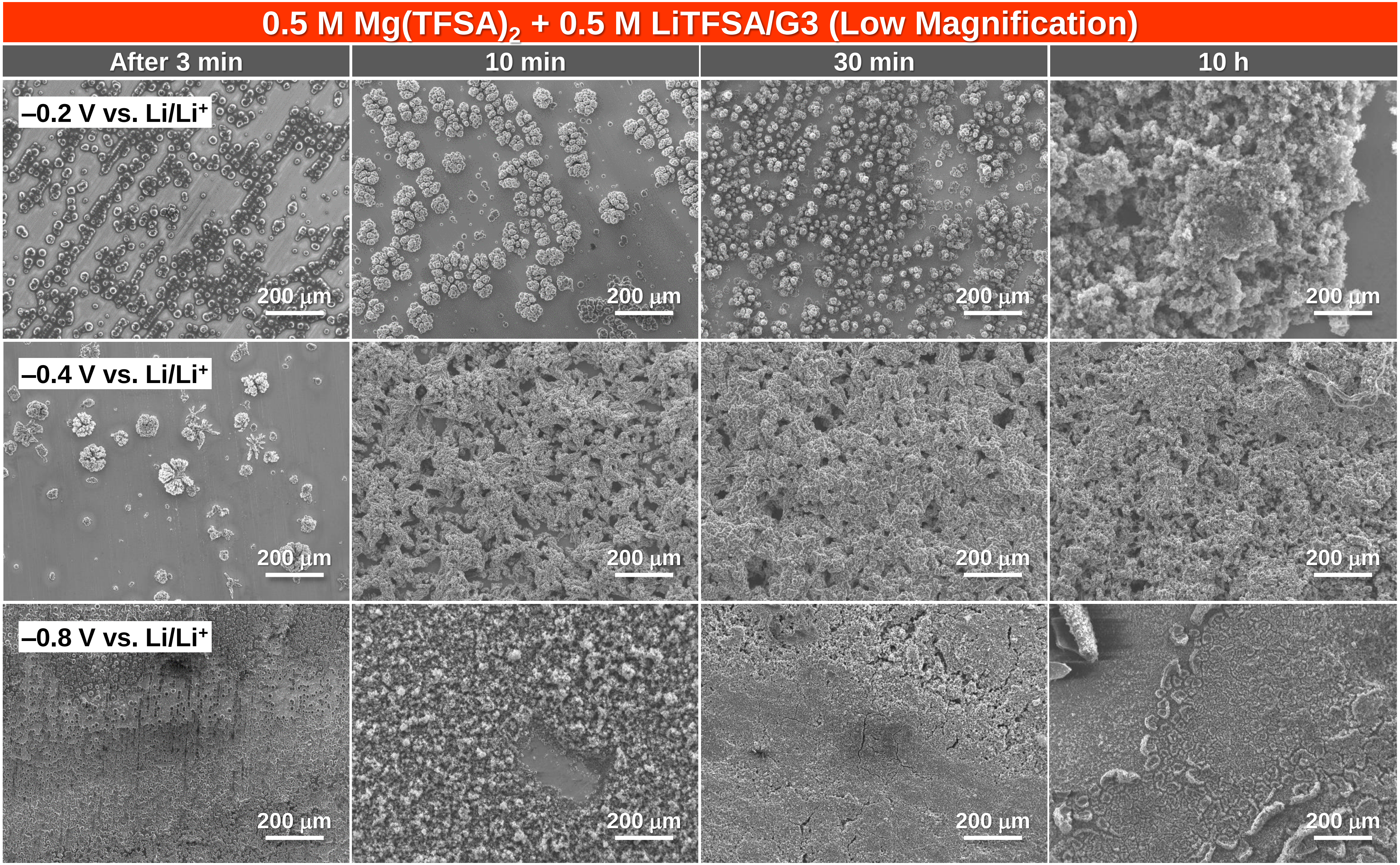

Figure S6. FE-SEM images for deposits obtained from 0.5 M Mg(TFSA)$_2$ + 0.5 M LiTFSA/G3 at various potentials vs. Li/Li$^+$. Magnification: ×100.

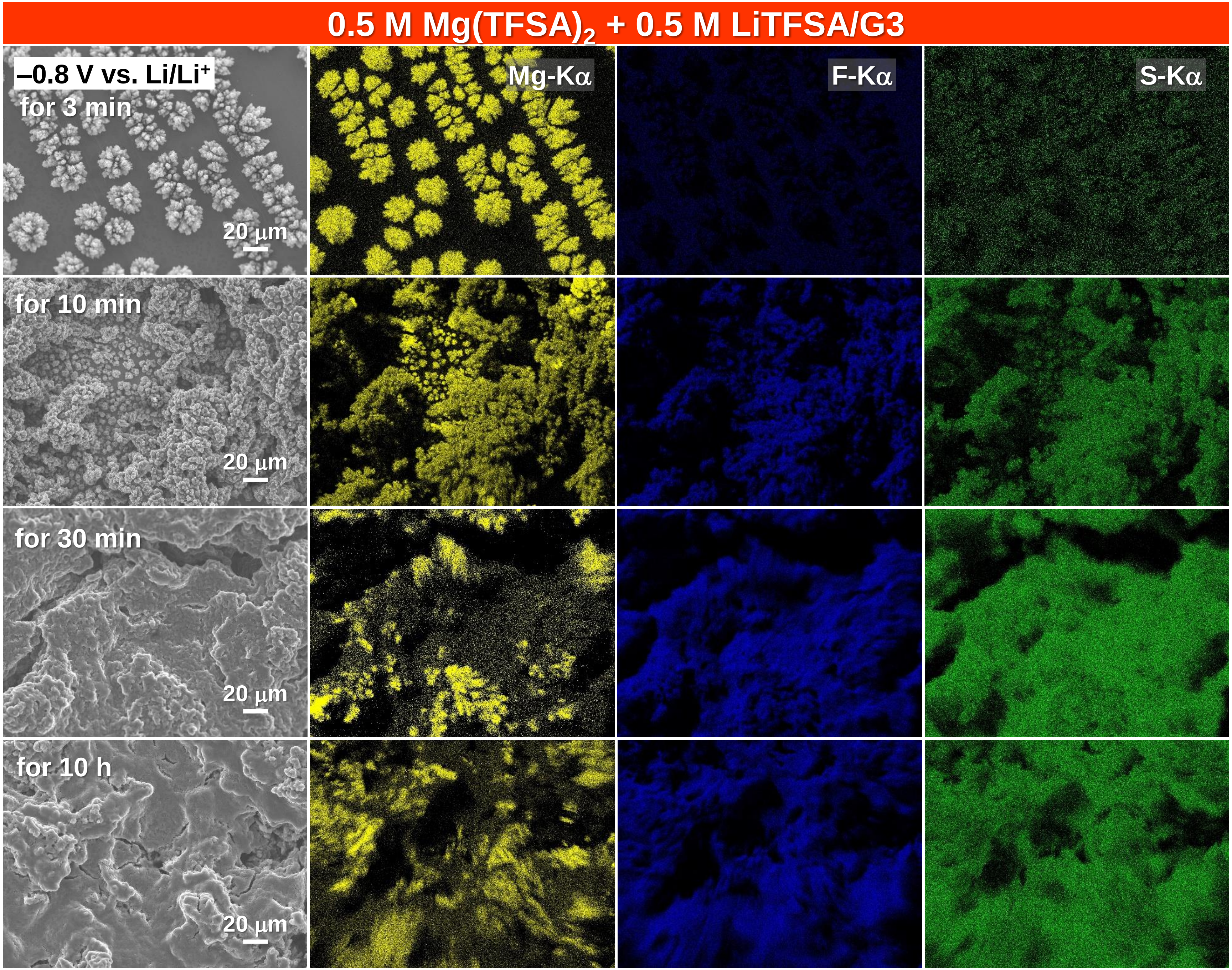

Figure S7. FE-SEM images and corresponding EDS mapping for deposits obtained from 0.5 M Mg(TFSA)$_2$ + 0.5 M LiTFSA/G3 for various time at the constant potential electrolysis at –0.8 V vs. Li/Li$^+$.

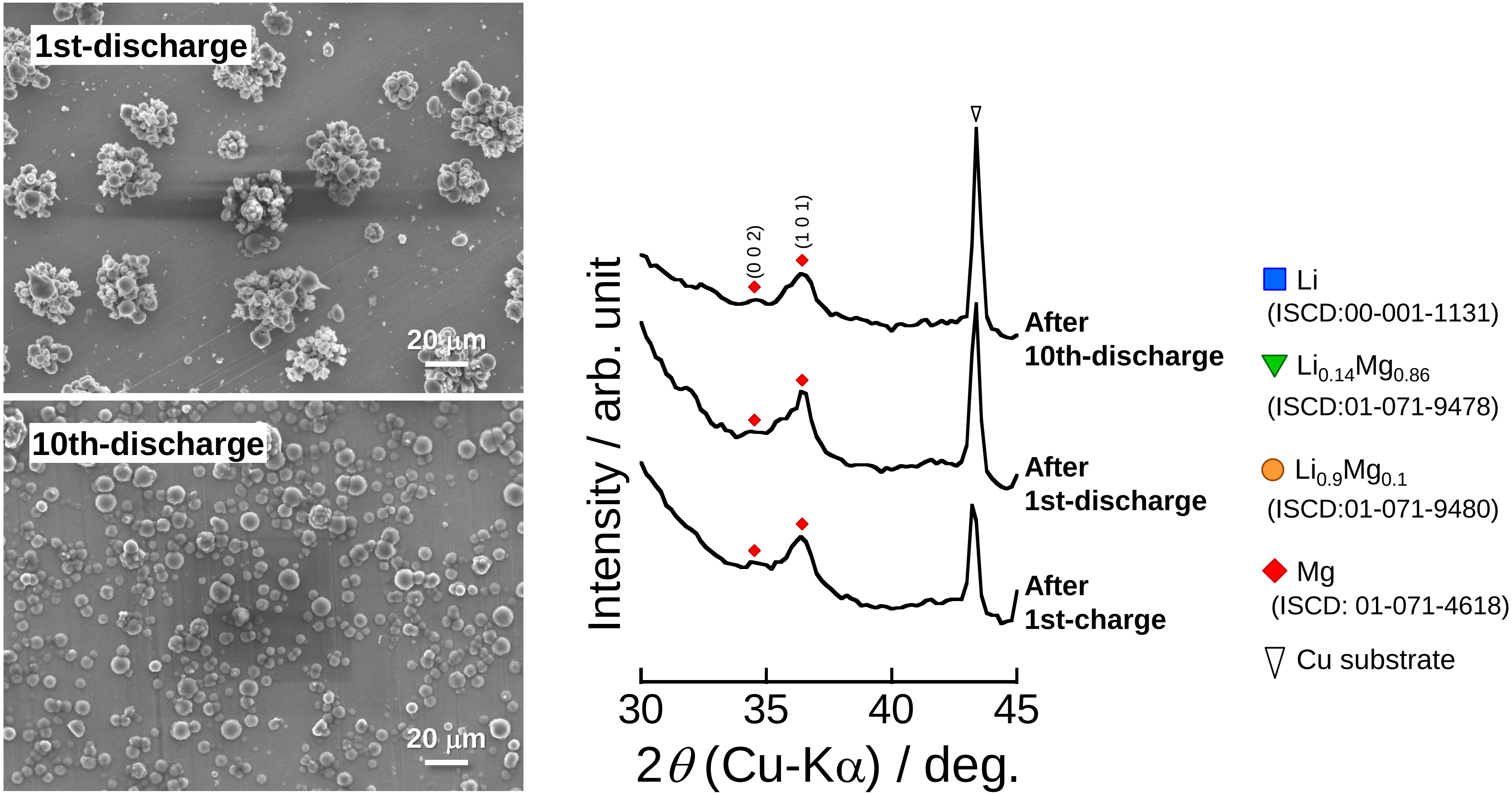

Figure S8. FE-SEM images and XRD patterns of deposits obtained in discharge state at the first cycle and 10th cycle in the electrolyte of 0.5 M $Mg(TFSA)_2$ + 0.5 M LiTFSA/G3 under constant current condition (0.1 mA cm^{-2}). The deposits were attributed to Mg metal, which means that Mg could not dissolute into the electrolyte as Mg ion. This is the reason for the low Coulombic efficiency.