

## Electronic Supporting Information (ESI)

### Substrate-dependent calcium plating on late-transition and p-block metals

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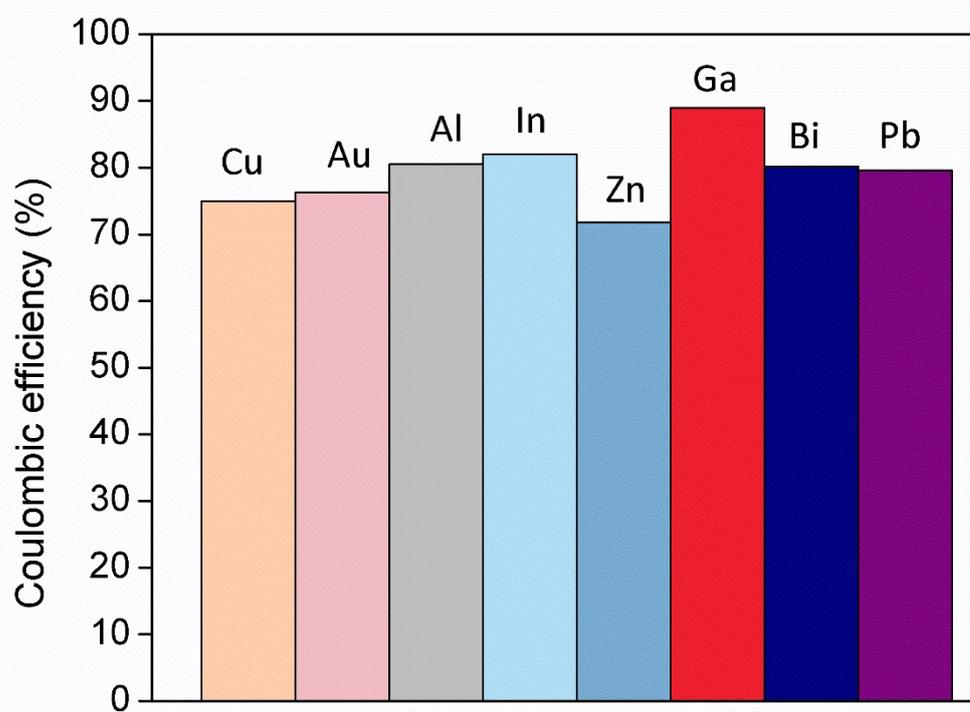


Figure S1: Coulombic efficiencies of the tenth CV cycles recorded for each of the metal electrodes.

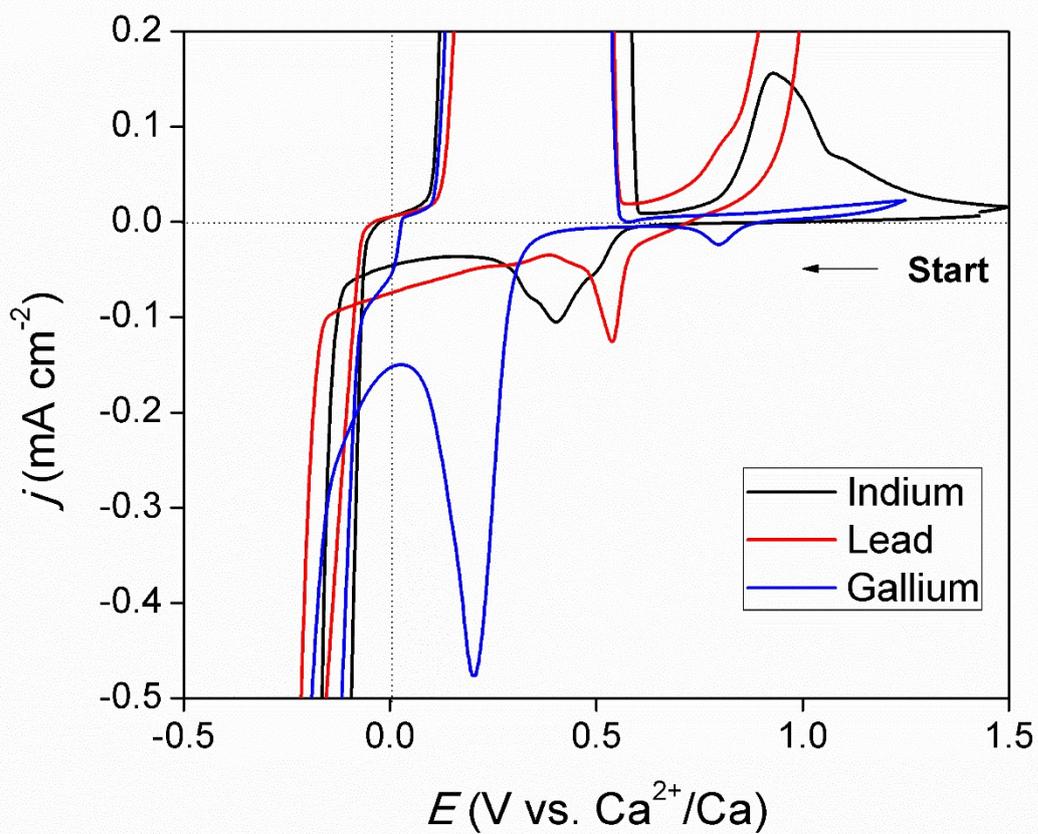


Figure S2: Magnified CVs (tenth cycle in Figure 1) recorded on In, Pb and Ga, using an electrolyte composed of 1.5 M of  $\text{Ca}(\text{BH}_4)_2$  in THF at 21 °C. The scan rate was  $1 \text{ mV s}^{-1}$ .

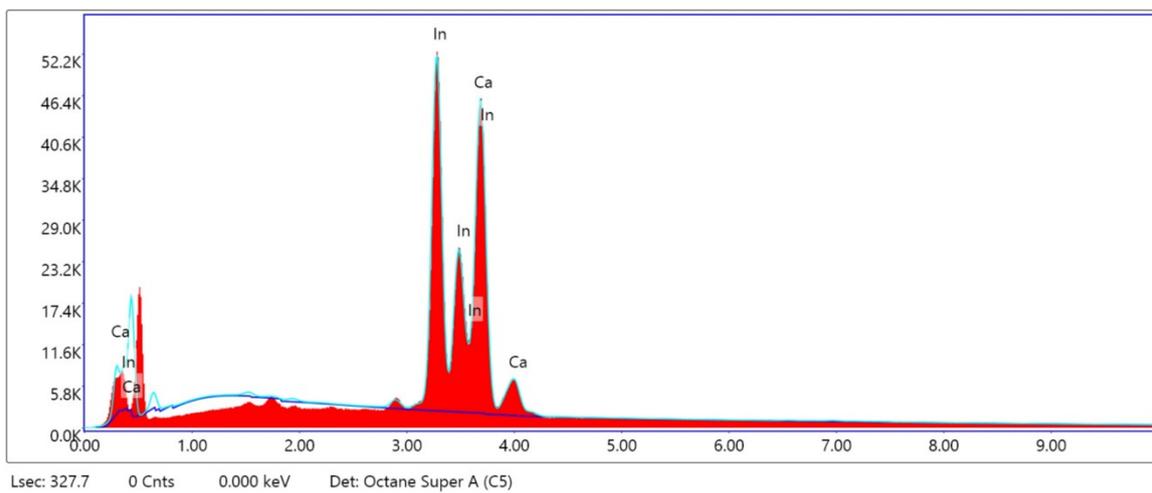


Figure S3: EDX spectrum of Ca deposit on an In electrode, corresponding to the elemental map seen in Figure 4 in the main text.

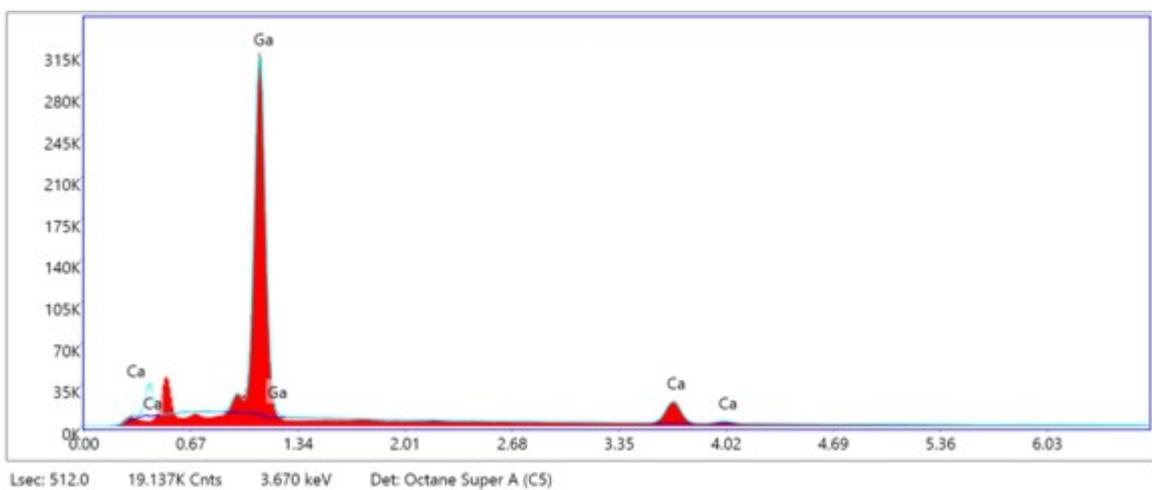


Figure S4: EDX spectrum of Ca deposit on a Ga electrode, corresponding to the elemental map seen in Figure 4 in the main text.

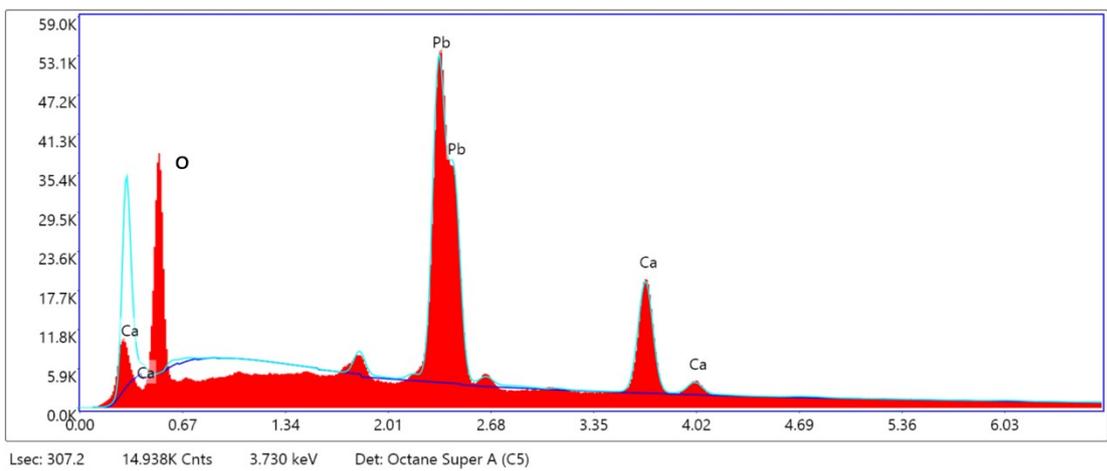


Figure S5: EDX spectrum of Ca deposit on a Pb electrode, corresponding to the elemental map seen in Figure 4 in the main text.

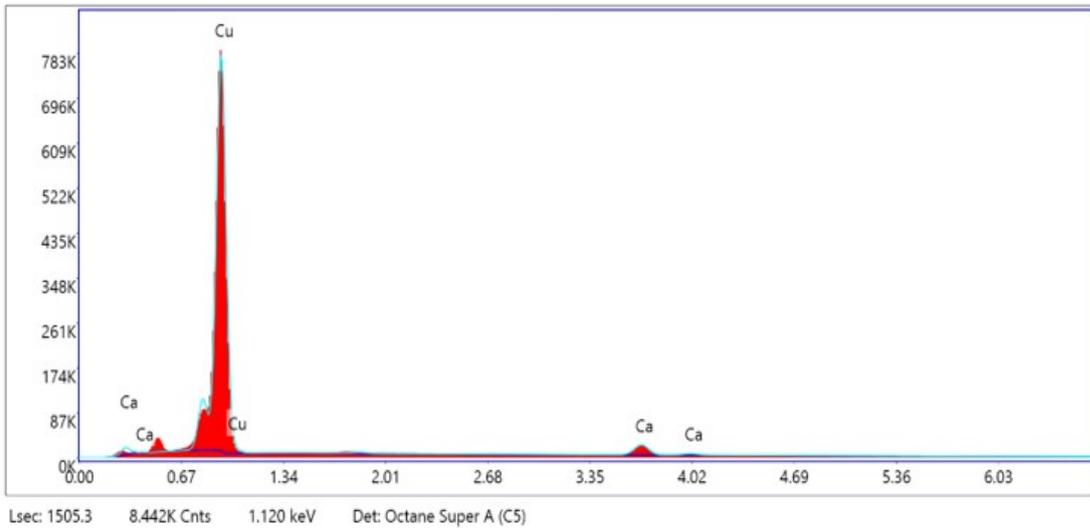


Figure S6: EDX spectrum of Ca deposit on a Cu electrode, corresponding to the elemental map seen in Figure 4 in the main text.

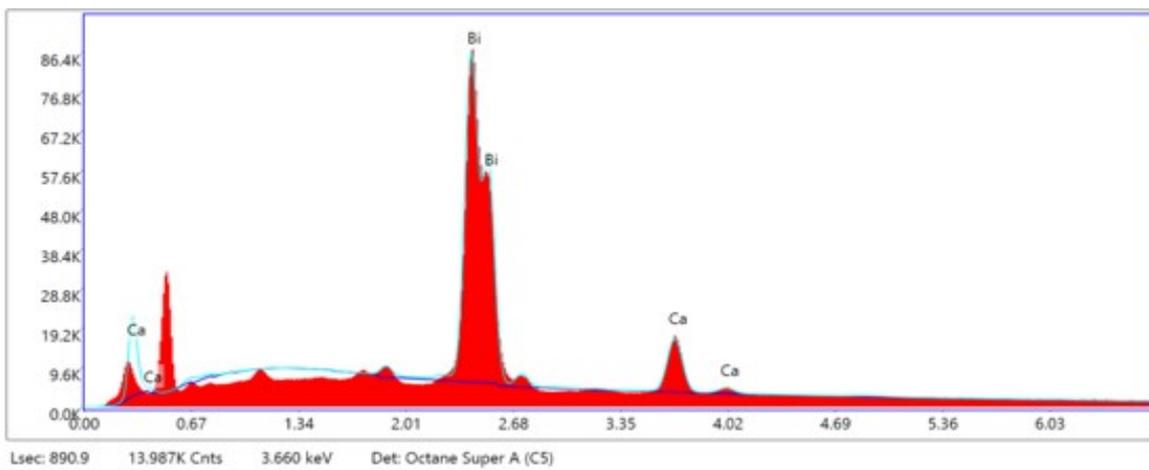


Figure S7: EDX spectrum of Ca deposit on a Bi electrode, corresponding to the elemental map seen in Figure 4 in the main text.

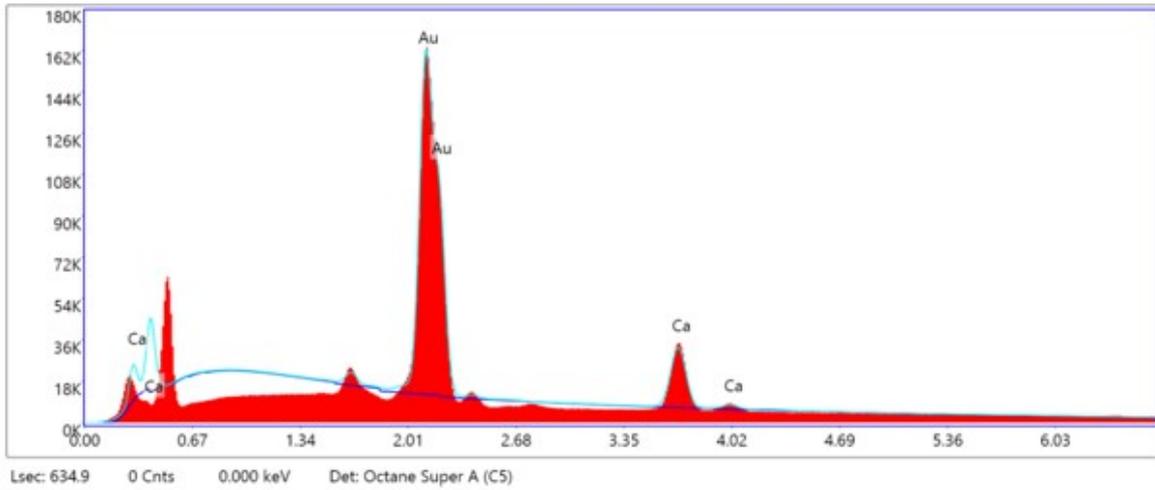


Figure S8: EDX spectrum of Ca deposit on an Au electrode, corresponding to the elemental map seen in Figure 4 in the main text.

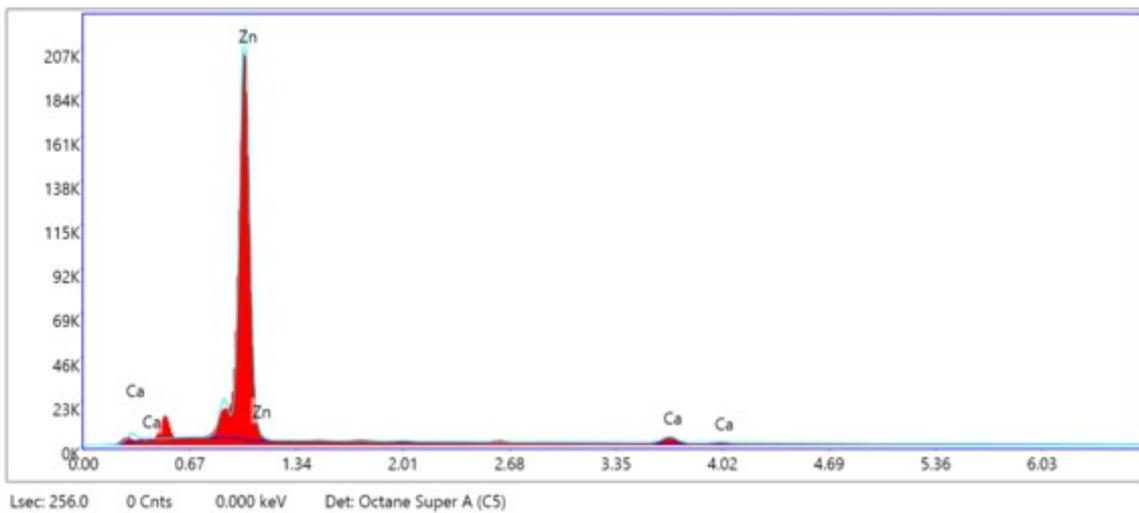


Figure S9: SEM image and EDX spectrum of Ca deposit on an Zn electrode, corresponding to the elemental map seen in Figure 4 in the main text.

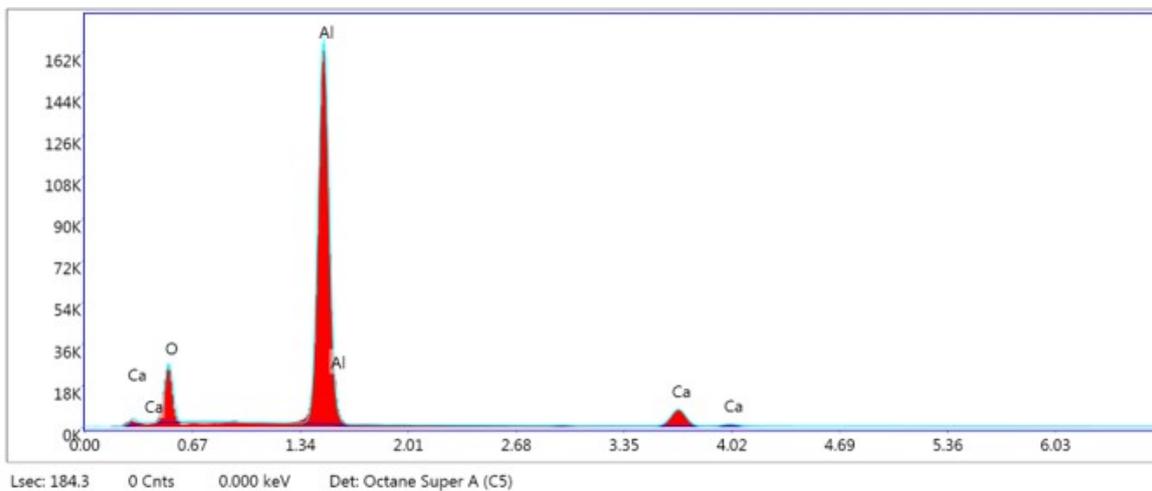


Figure S10: EDX spectrum of Ca deposit on an Al electrode, corresponding to the elemental map seen in Figure 4 in the main text.

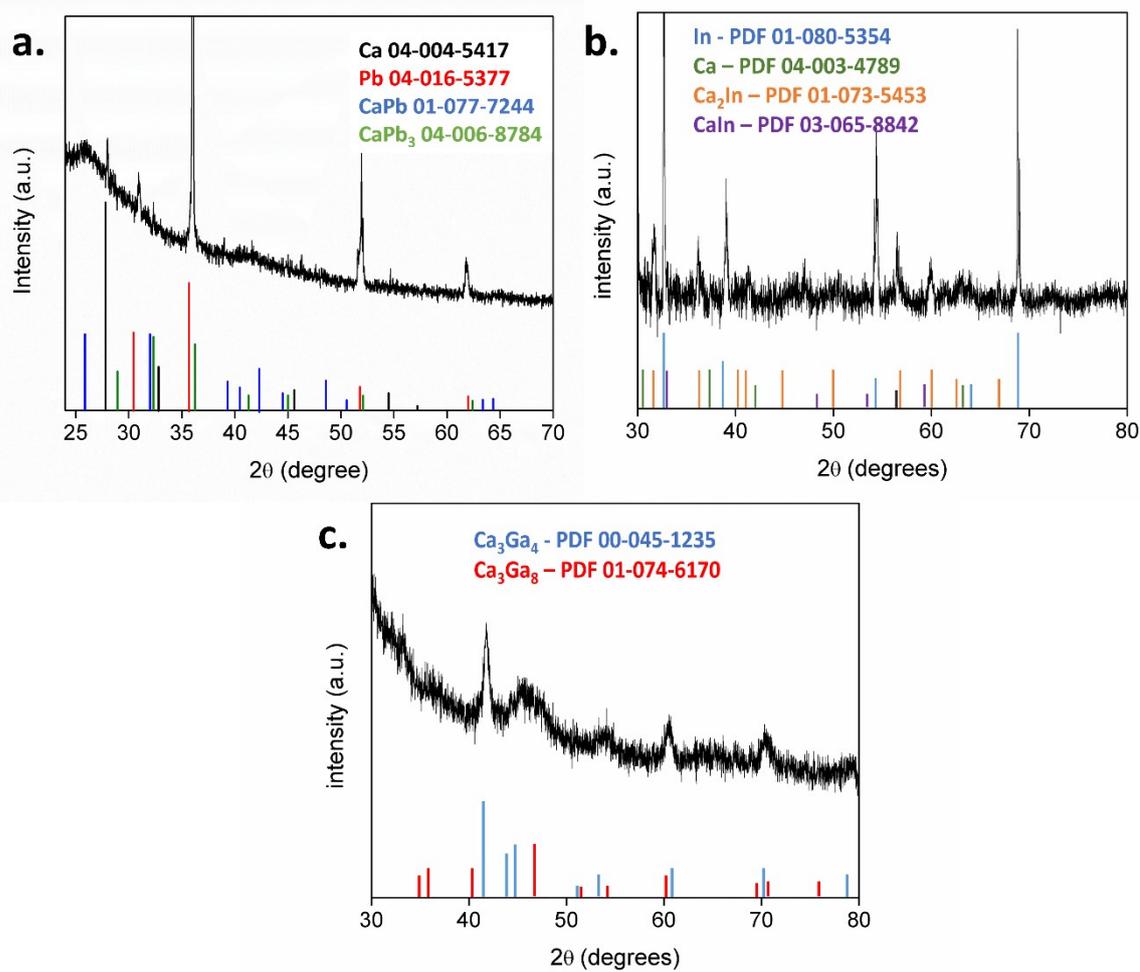


Figure S11: XRD diffractograms measured for Ca deposits on In, Pb and Ga electrodes. The deposits were generated by applying  $1 \text{ mA cm}^{-2}$  for 360s.

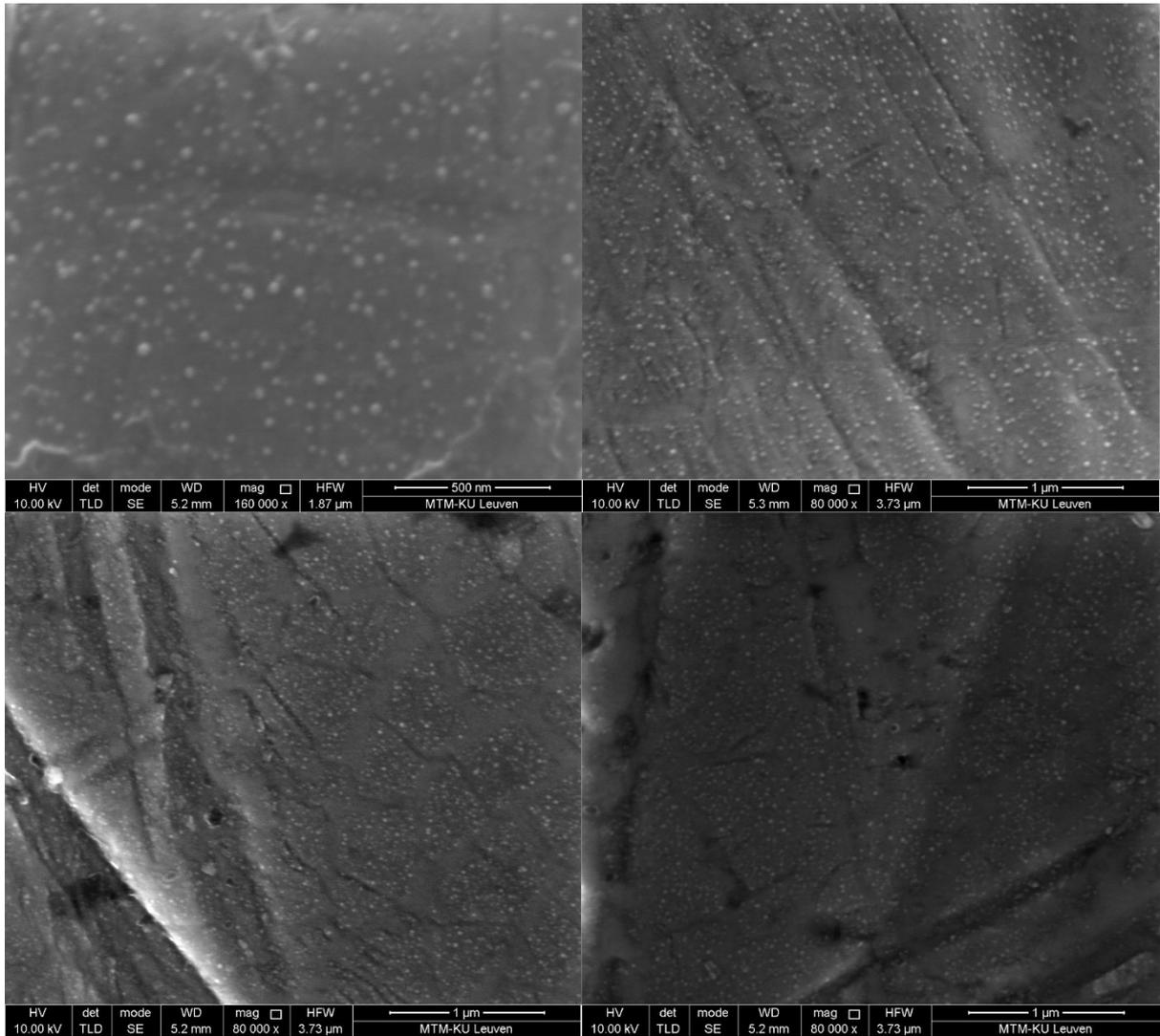


Figure S12: Top-down SEM images of Ca nuclei on In electrodes, generated by applying  $1 \text{ mA cm}^{-2}$  for 3.6 s (capacity density of  $0.001 \text{ mAh cm}^{-2}$ ). The applied acceleration voltage was 10 keV.

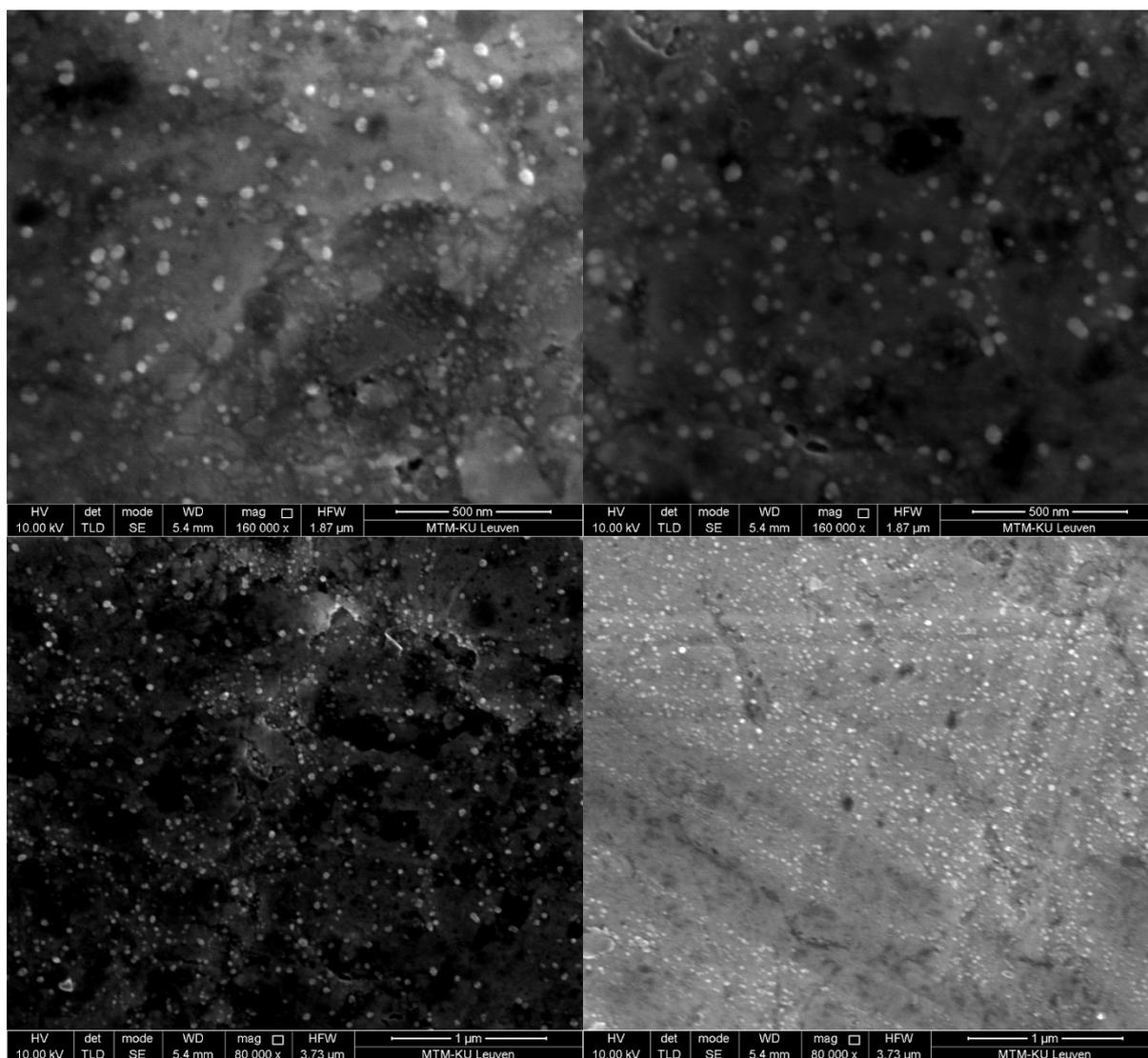


Figure S13: Top-down SEM images of Ca nuclei on Pb electrodes, generated by applying  $1 \text{ mA cm}^{-2}$  for 3.6 s (capacity density of  $0.001 \text{ mAh cm}^{-2}$ ). The applied acceleration voltage was 10 keV.