The Electrochemical Characterization of Nanostructured Bi_2Se_3 Thin Films in an Aqueous Na Electrolyte

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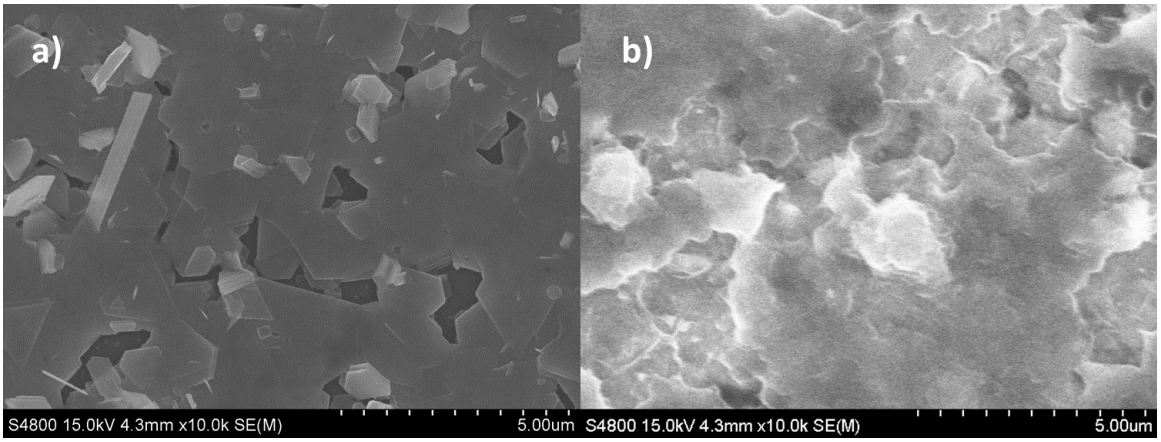
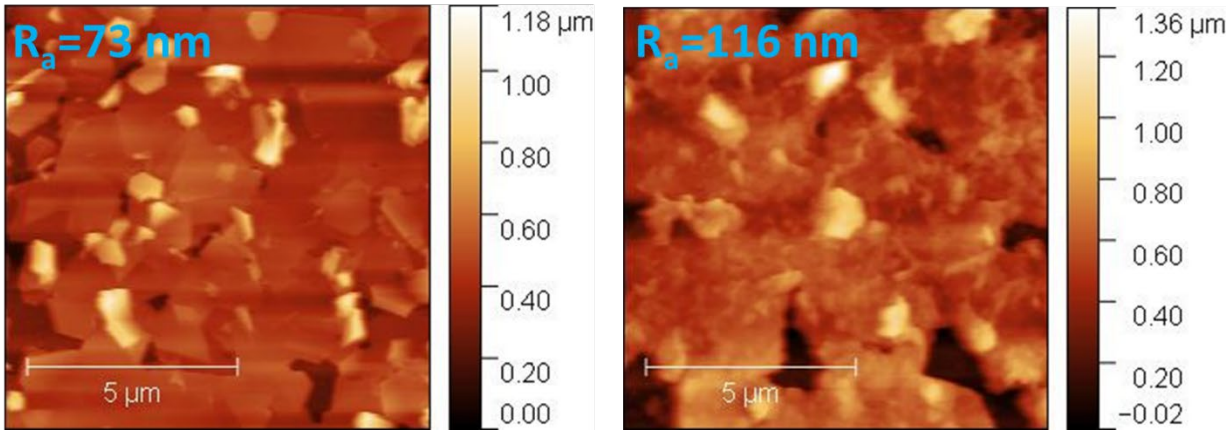
Supplementary info

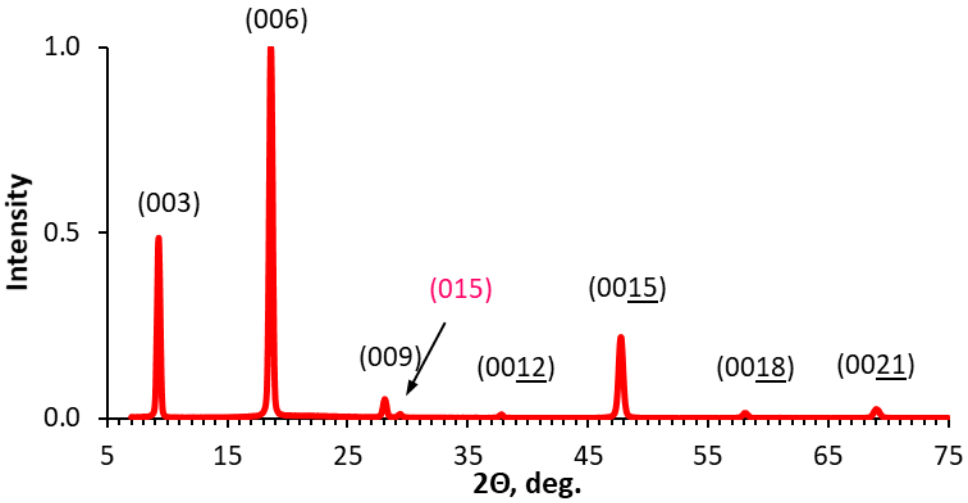


Supplementary Figure S1. SEM images: (**a**) fresh sample; (**b**) after 30 CV cycles at 1 mV/s scan rate.



Supplementary Figure S2. AFM scans and R_a values for the roughness: (**a**) fresh sample; (**b**) after 30 CV cycles at 1 mV/s scan rate.

XRD spectra:



Supplementary Figure S3. XRD spectra of a fresh Bi_2Se_3 thin film on glass. The peak (015) represents the disordered part of the Bi_2Se_3 film. As its intensity is very low, it suggests that the disordered nanostructures were grown only on the top layer of the film.

A possible ASIBs battery system that could use the investigated material (Bi_2Se_3 thin film) could consist of the following parts: anode (Bi_2Se_3 thin films), electrolyte (1 M $NaNO_3$), cathode (MnO_2 or Na_xMnO_2), and separator (solid electrolyte separator composed of NASICON-type). This system might be prepared in the coin half-cells (e.g. CR2032).

Cathode material reference link https://doi.org/10.1016/j.mtener.2020.100432

Separator link https://doi.org/10.1016/j.jpowsour.2020.228950