

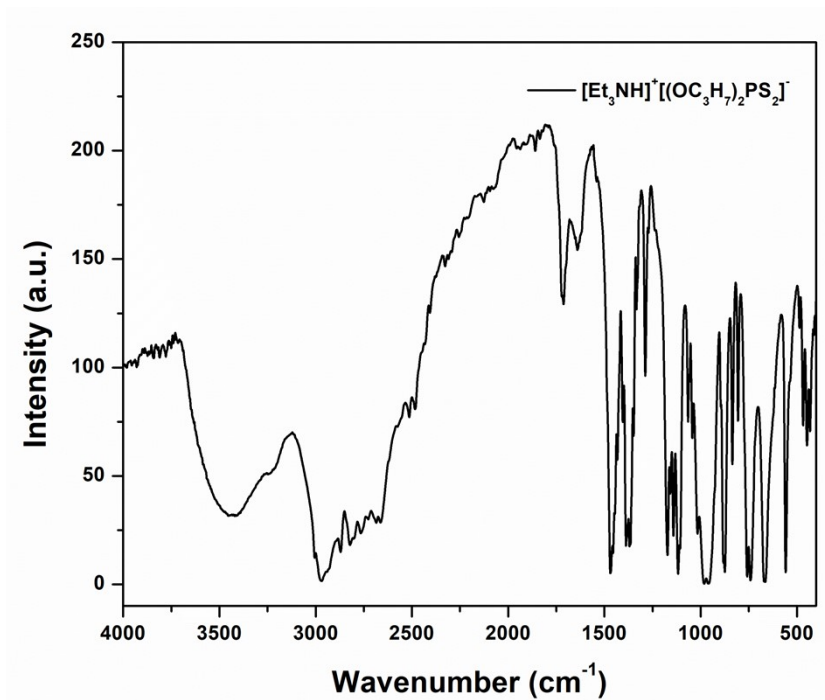
Electronic Supplementary Information for:

**Solution-based *in-situ* deposition of  $\text{Sb}_2\text{S}_3$  from a single source precursor for resistive random-access memory devices**

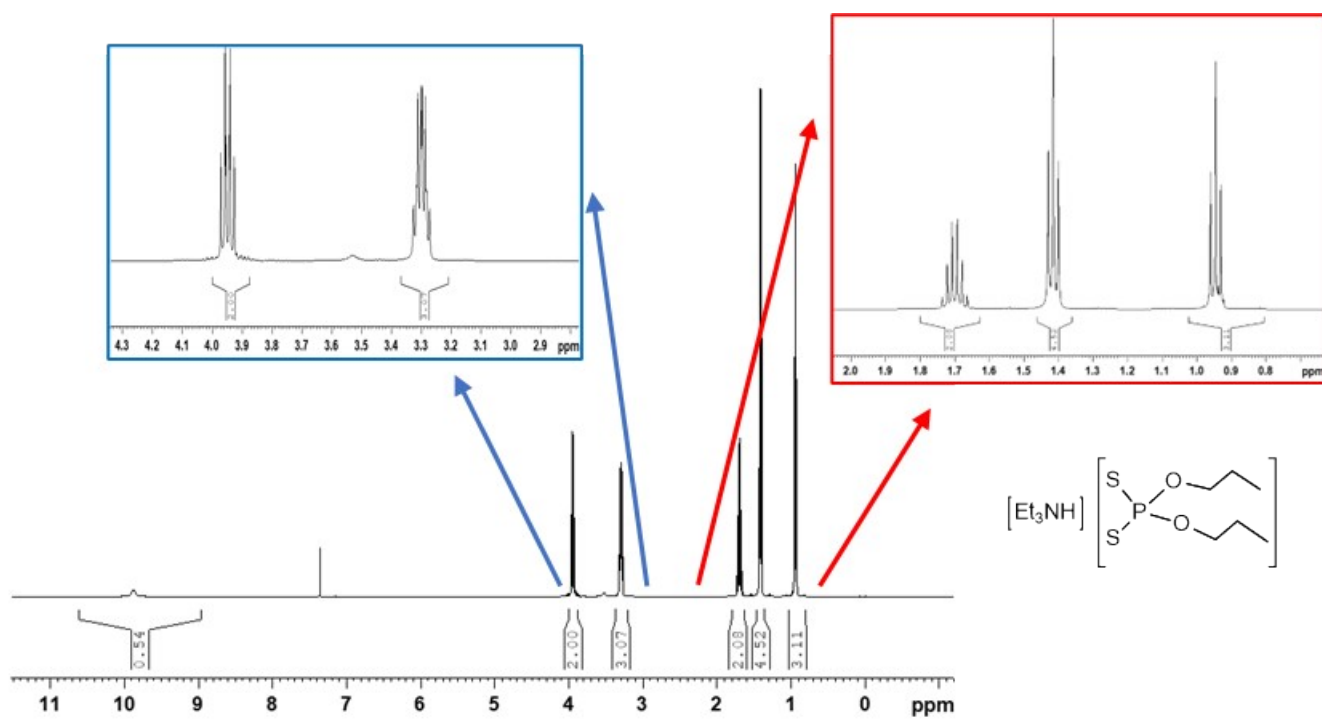
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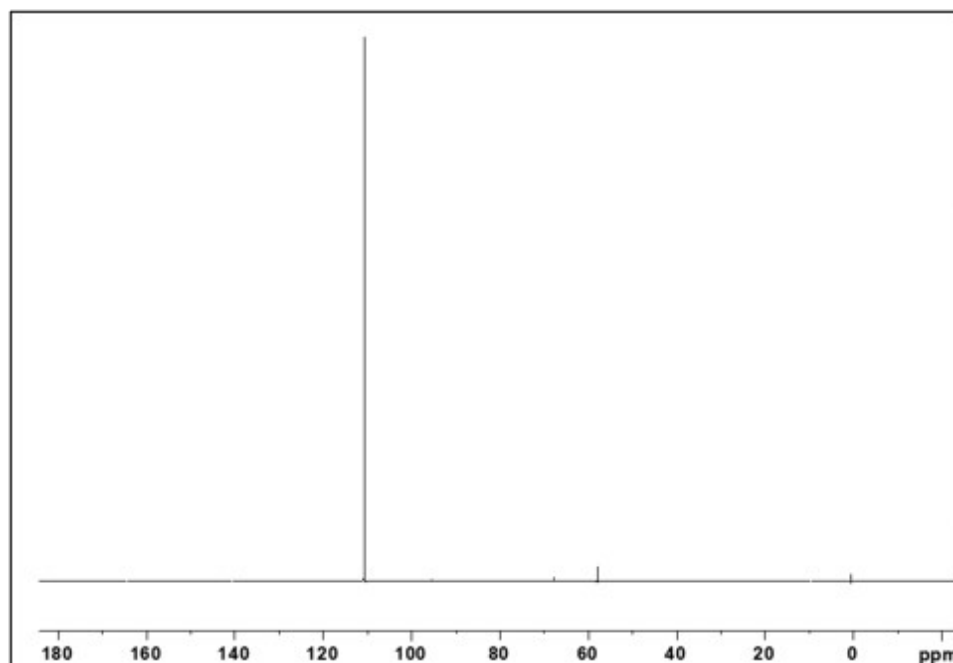
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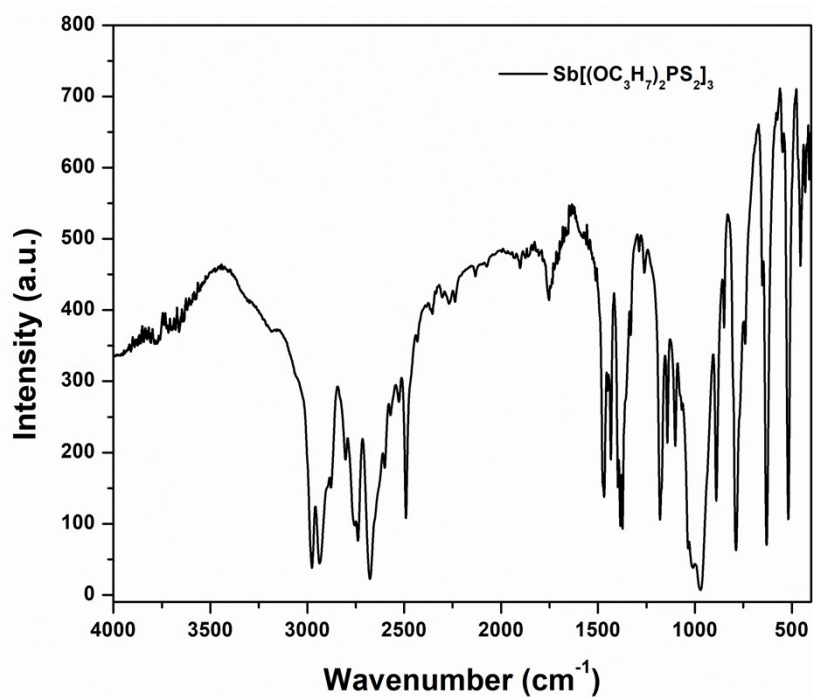
**Figure S1.** FT-IR spectrum of the  $[\text{Et}_3\text{NH}]^+ [(\text{OC}_3\text{H}_7)_2\text{S}_2\text{P}]^-$  ligand using KBr discs



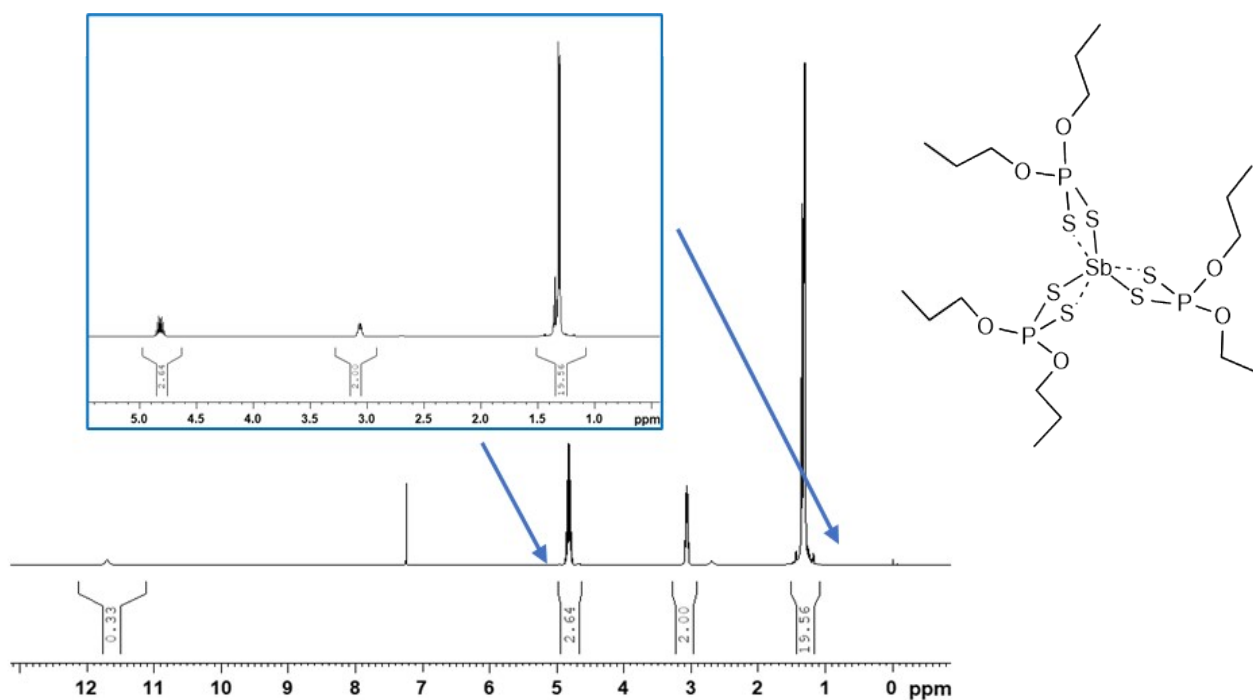
**Figure S2.** Room temperature  $\{^1\text{H}\}$  NMR spectrum of  $[\text{Et}_3\text{NH}]^+ [(\text{OC}_3\text{H}_7)_2\text{S}_2\text{P}]^-$  ligand (in  $\text{CDCl}_3$ ).



**Figure S3.** Room temperature  $^{31}\text{P}\{^1\text{H}\}$  NMR spectrum of  $[\text{Et}_3\text{NH}]^+ [(\text{OC}_3\text{H}_7)_2\text{S}_2\text{P}]^-$  ligand (in  $\text{CDCl}_3$ ).

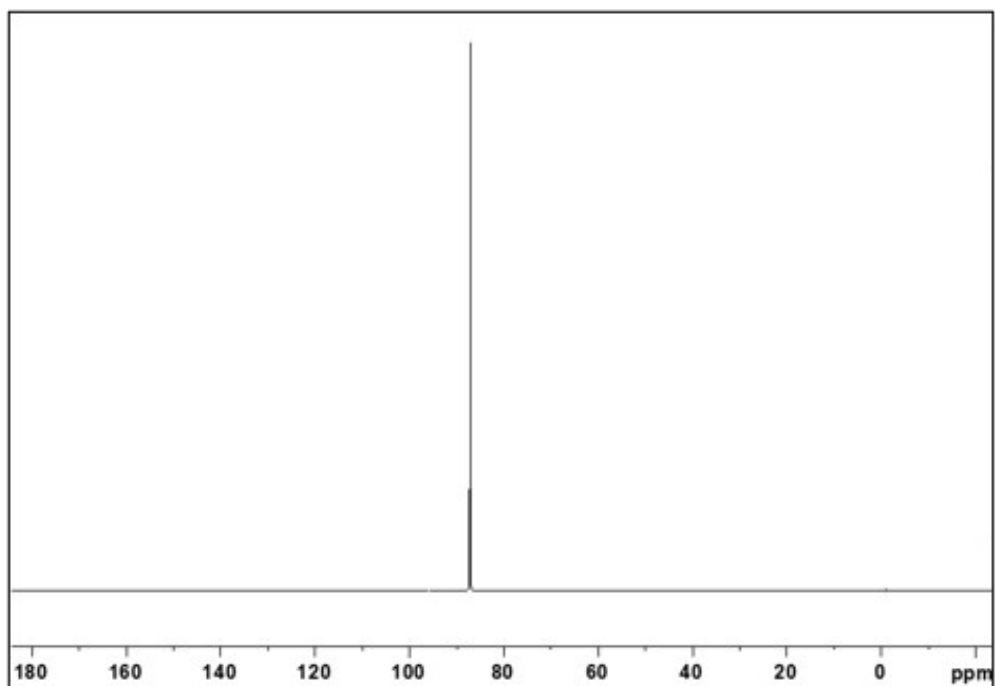


**Figure S4.** FT-IR spectrum of the  $Sb[(OC_3H_7)_2S_2P]_3$  complex using KBr discs

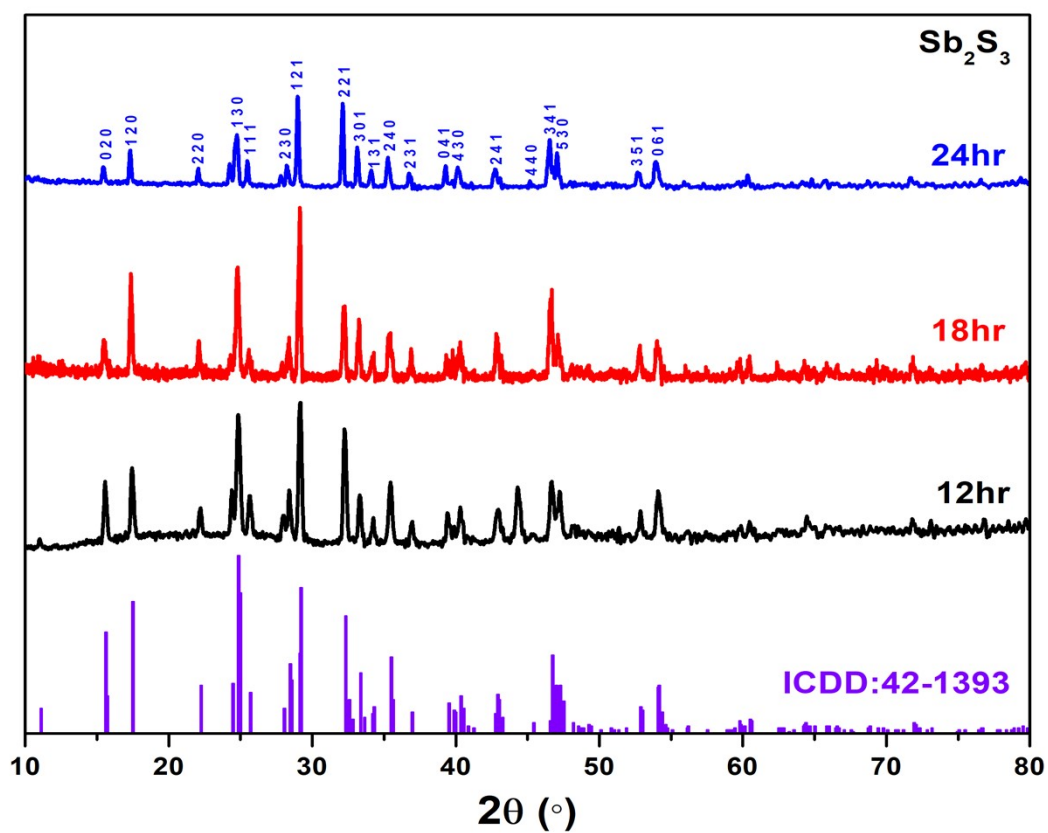


**Figure S5.** Room temperature  $\{^1H\}$  NMR spectrum of  $Sb[(OC_3H_7)_2S_2P]_3$  complex (in  $CDCl_3$ ).

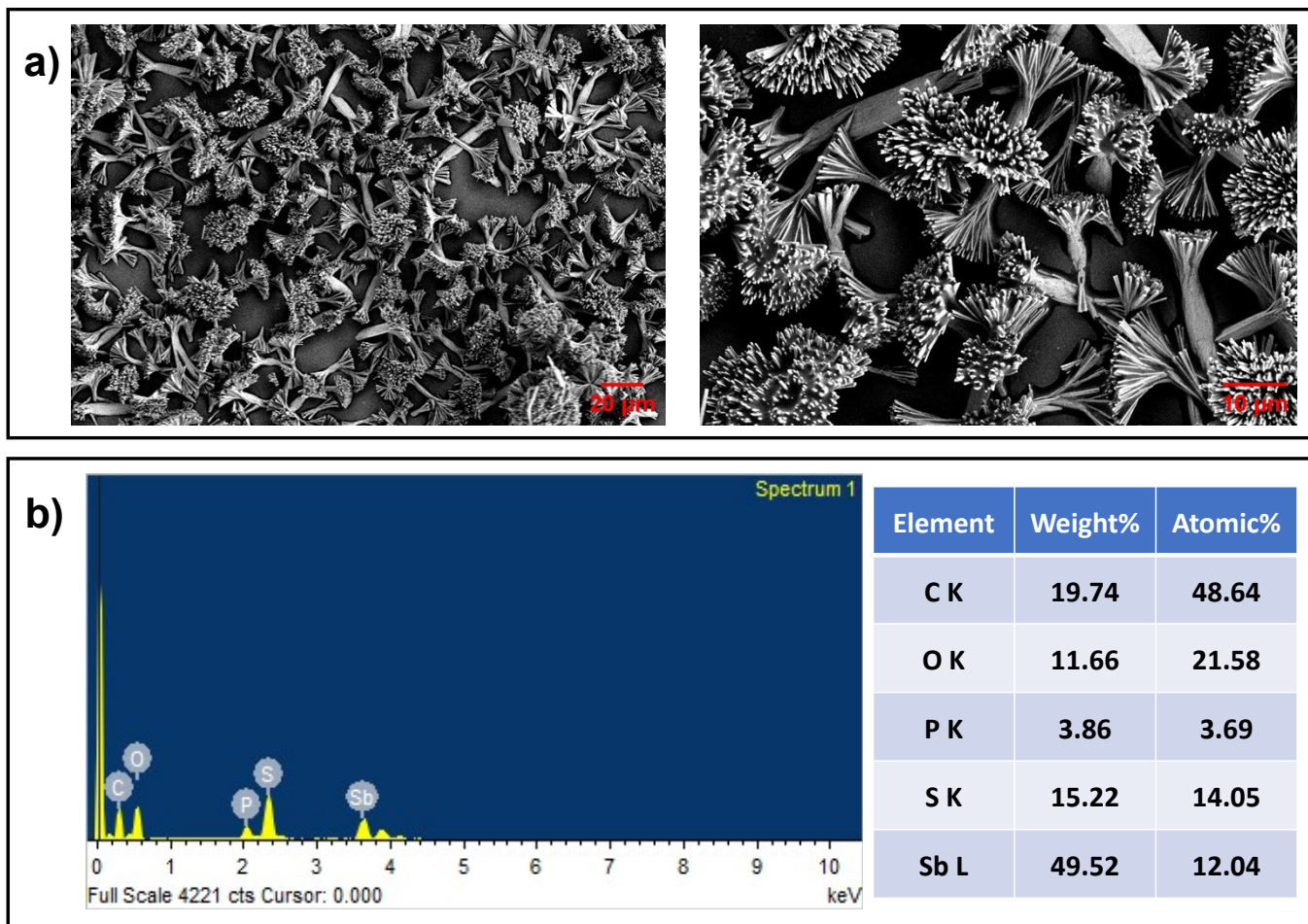




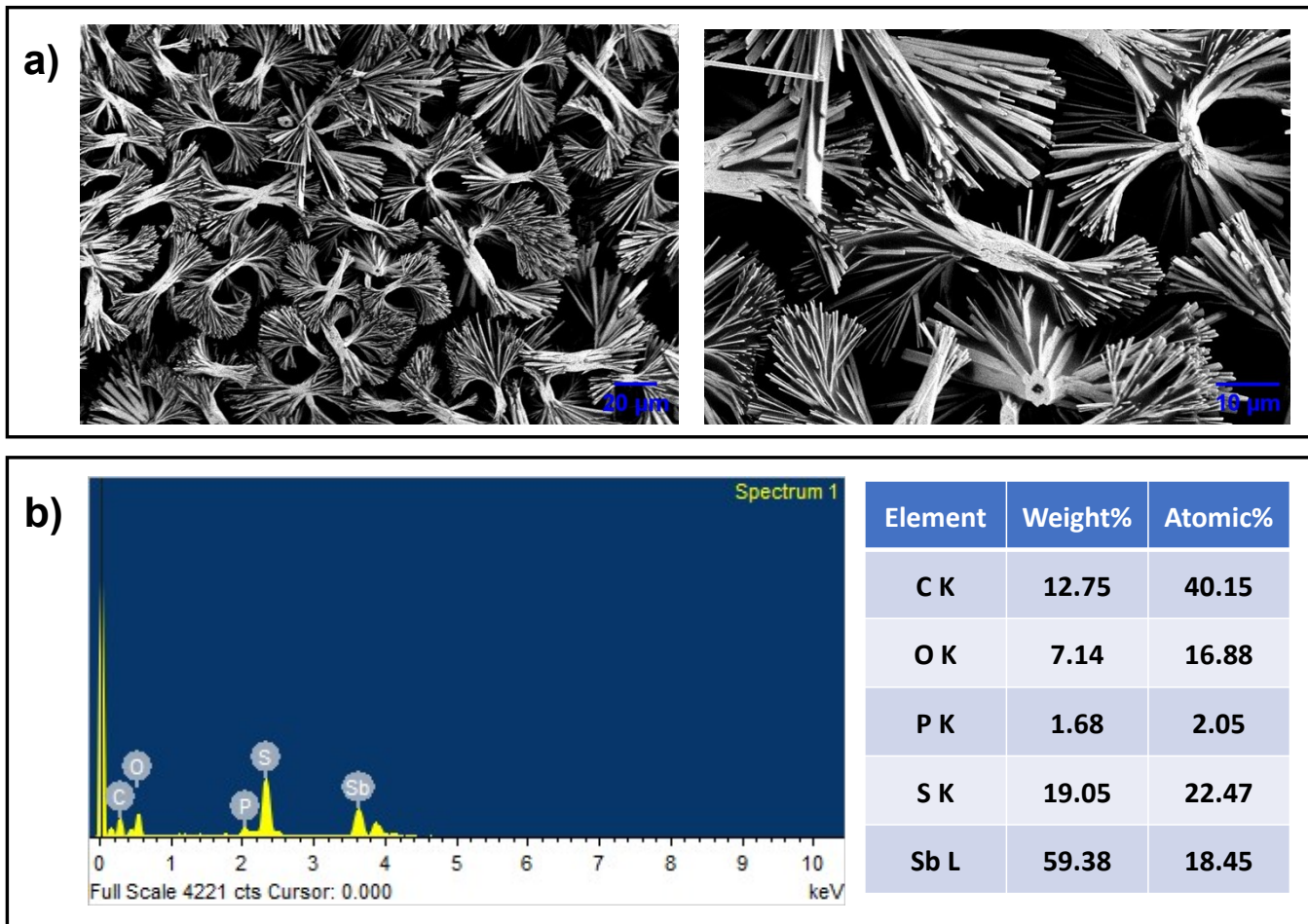
**Figure S6.** Room temperature  $^{31}\text{P}\{^1\text{H}\}$  NMR spectrum of  $\text{Sb}[(\text{OC}_3\text{H}_7)_2\text{S}_2\text{P}]_3$  complex (in  $\text{CDCl}_3$ ).



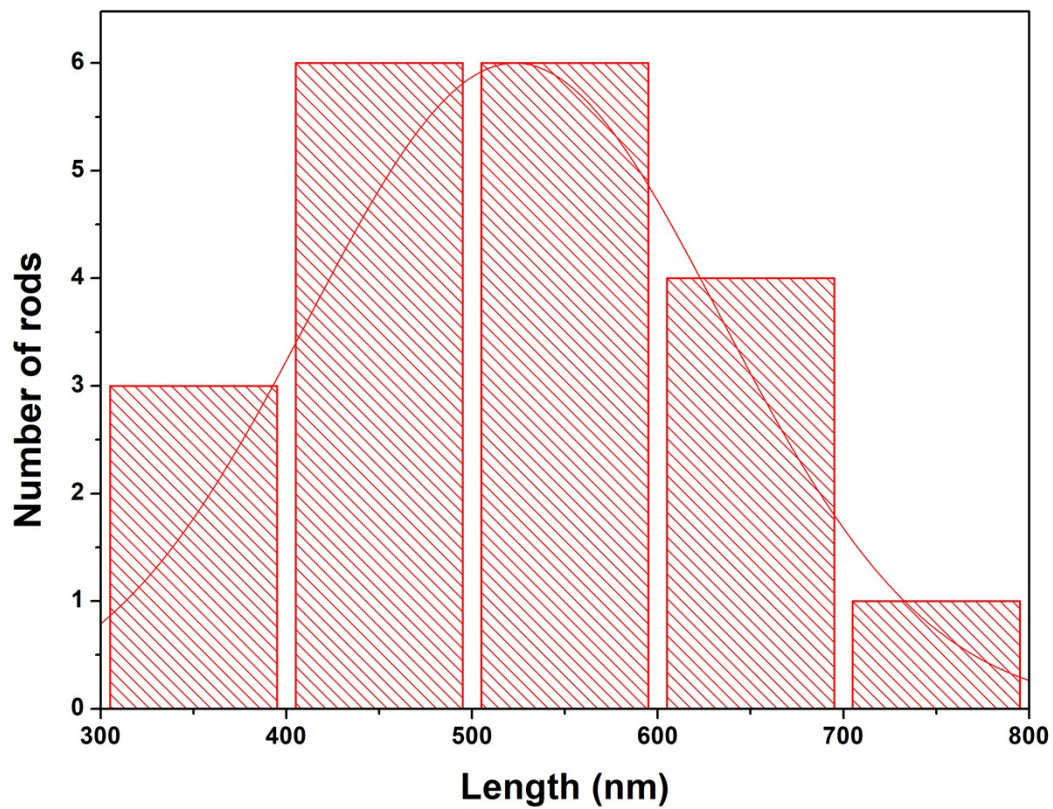
**Figure S7.** XRD spectrum of the as-deposited  $\text{Sb}_2\text{S}_3$  on FTO at various reaction times using  $\text{Sb}[(\text{OC}_3\text{H}_7)_2\text{S}_2\text{P}]_3$  as SSP



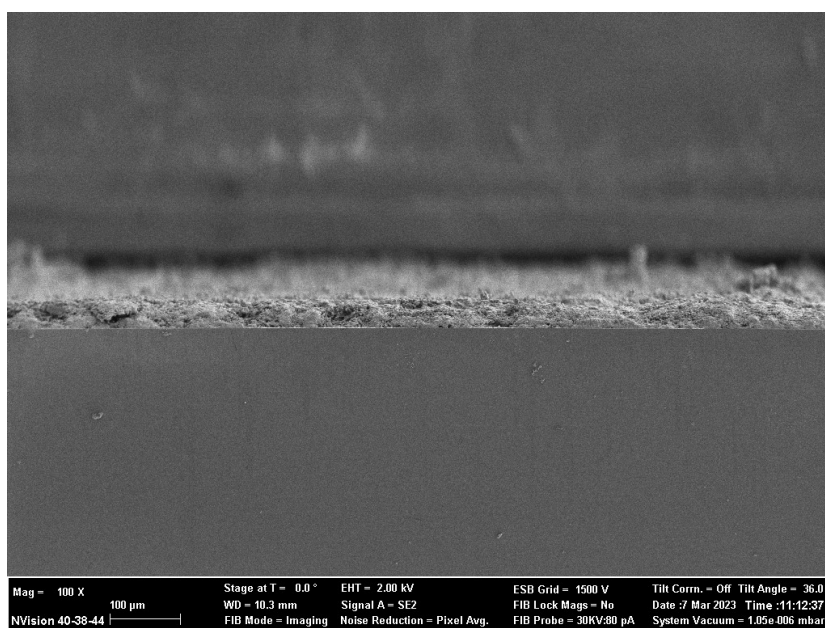
**Figure S8.** a) SEM micrograph b) EDX elemental mapping c) EDX spectrum with percentage of elements of deposited  $\text{Sb}_2\text{S}_3$  film on FTO at a reaction time of 12hr



**Figure S9.** a) SEM micrograph b) EDX elemental mapping c) EDX spectrum with percentage of elements of deposited  $\text{Sb}_2\text{S}_3$  film on FTO at a reaction time of 18hr

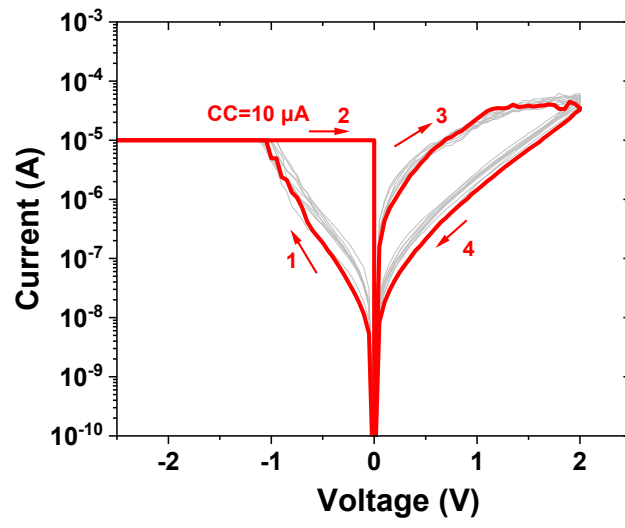


**Figure S10.** Size distribution histogram of  $\text{Sb}_2\text{S}_3$



**Figure S11.** Cross-section image of deposited  $\text{Sb}_2\text{S}_3$  on FTO





**Figure S12.** Bipolar non-volatile resistive switching behaviours of the W/Sb<sub>2</sub>S<sub>3</sub>/FTO