Supplementary data

Bis(selenobenzoato)dibutyltin(IV) as a single source precursor for the synthesis of SnSe nanosheets and their photo-electrochemical study for water splitting

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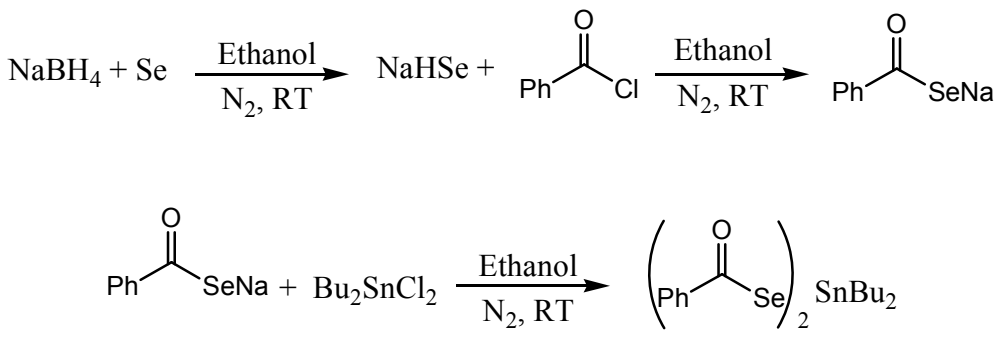

Scheme S1. The reaction scheme for the synthesis of selenobenzoate salt and *bis*(selenobenzoato)Bu_2Sn(IV) complex.

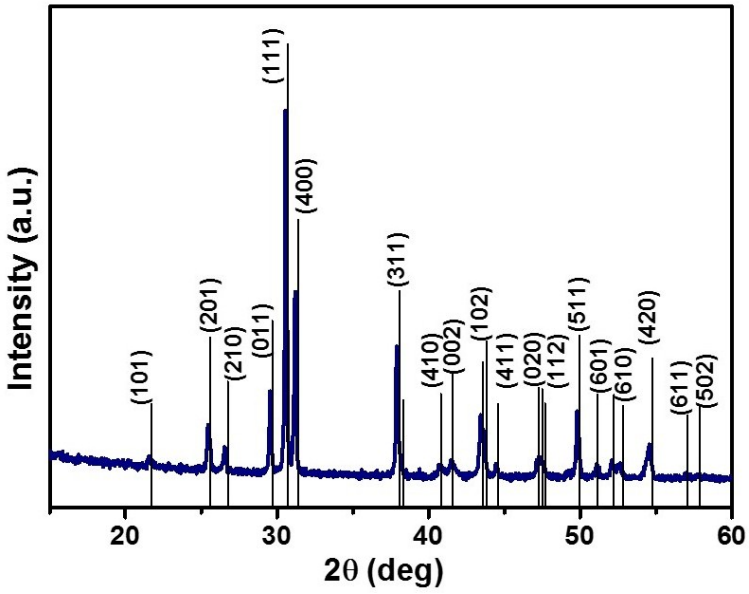

Figure S1. p-XRD of residue obtained by decomposition of complex **(1)** under nitrogen atmosphere showing formation of SnSe (ICDD # 00-014-0159).

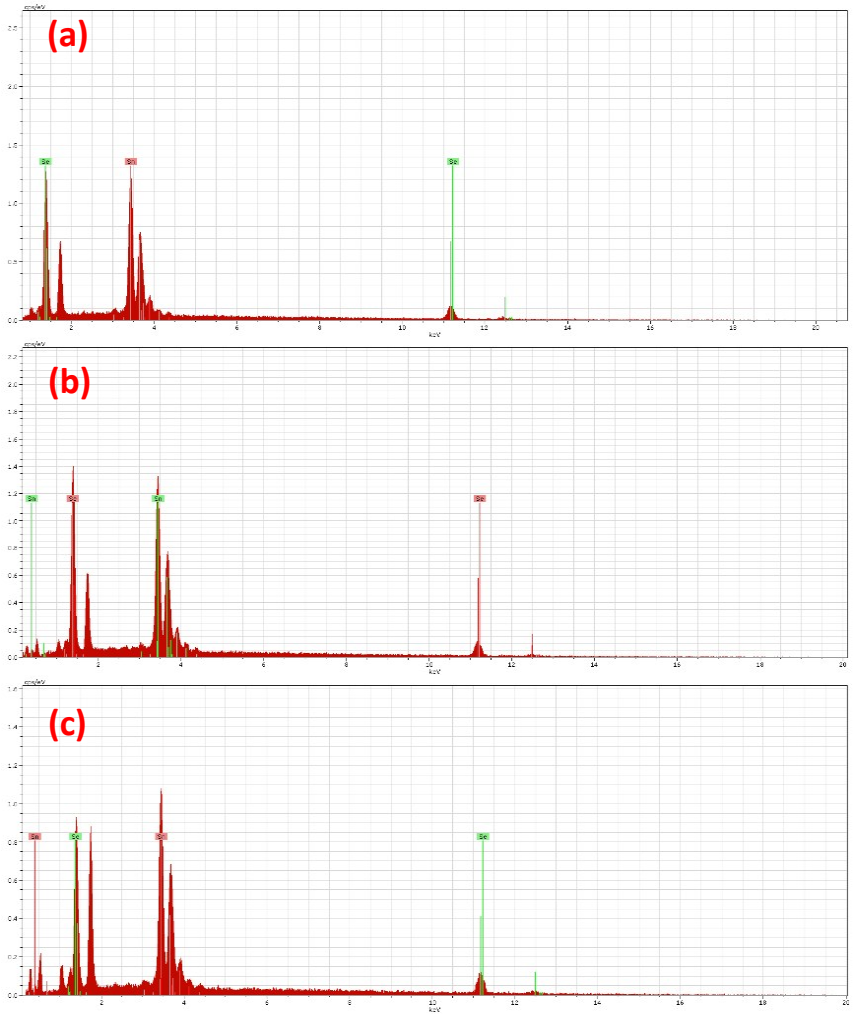

Figure S2. EDX spectra of thin films deposited at (a) 375 °C, (b) 425 °C and (c) 475 °C by AACVD.

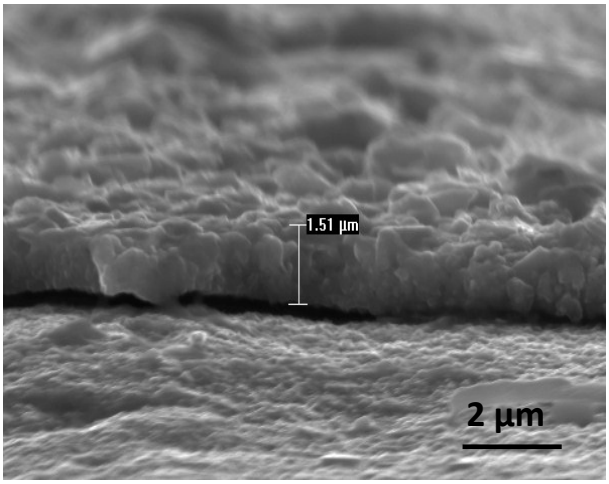

Figure S3. Thickness of the SnSe film deposited at 425 °C.

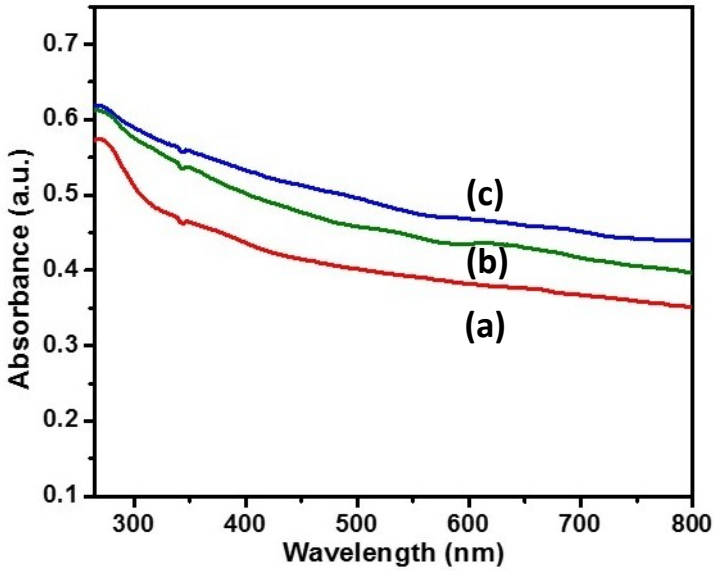

Figure S4. The absorption spectra of SnSe thin films, deposited at (a) 375 °C, (b) 425 °C and (c) 475 °C.

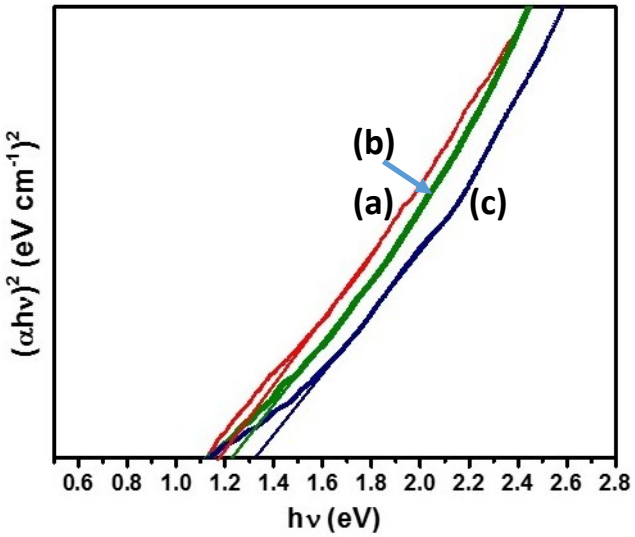

Figure S5. Energy band gap of the SnSe thin films, deposited at (a) 375 °C, (b) 425 °C and (c) 475 °C.

Equation S1-S3

$$2H_2 + O_2 \longrightarrow 2H_2O \quad (1) \qquad \Delta H = 572 \text{ KJ / Mole}$$

This reaction of water splitting involves two half-cell reactions as shown in the following equations 2 and 3.

Oxidation half cell reaction

$$2H_2O \longrightarrow O_2 + 4H^+ + 4e^- \quad E_{ox} = 1.23 \text{ V vs NHE} \quad (2)$$

Reduction half cell reaction

$$4H^+ + 4e^- \longrightarrow 2H_2 \quad E_{red} = 0 \text{ V vs NHE} \quad (3)$$