

Supporting Information

Anodic Deposition of NiO_x Water Oxidation Catalysts from Macrocyclic Nickel(II) Complexes

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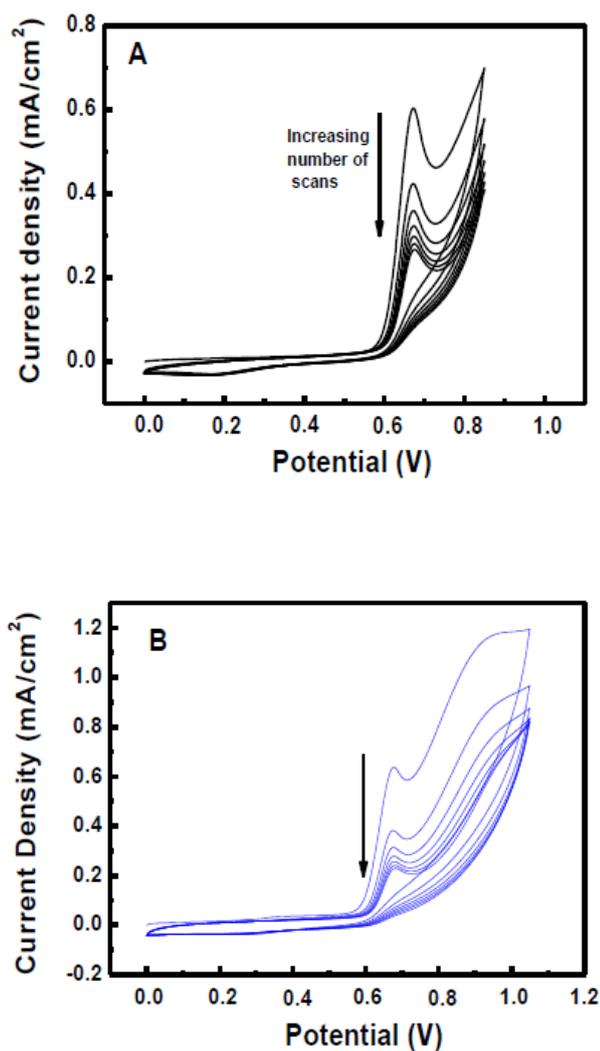


Fig. S1 (A) Continuous CV scans recorded on 1.0 mM solution of $[\text{Ni}(\text{tacn})_2]^{2+}$ in 0.10 M NaBi buffer with potential window switched just after first anodic peak potential. Arrow shows the decrease in peak current density with increase in number of consecutive scans. (B) Continuous CV scans in 1 mM $[\text{Ni}(\text{tacn})_2]^{2+}$ in 0.10 M NaBi buffer with scan reversed before onset of water oxidation catalysis. Arrow shows the decrease in peak current density with increase in number of consecutive scans.

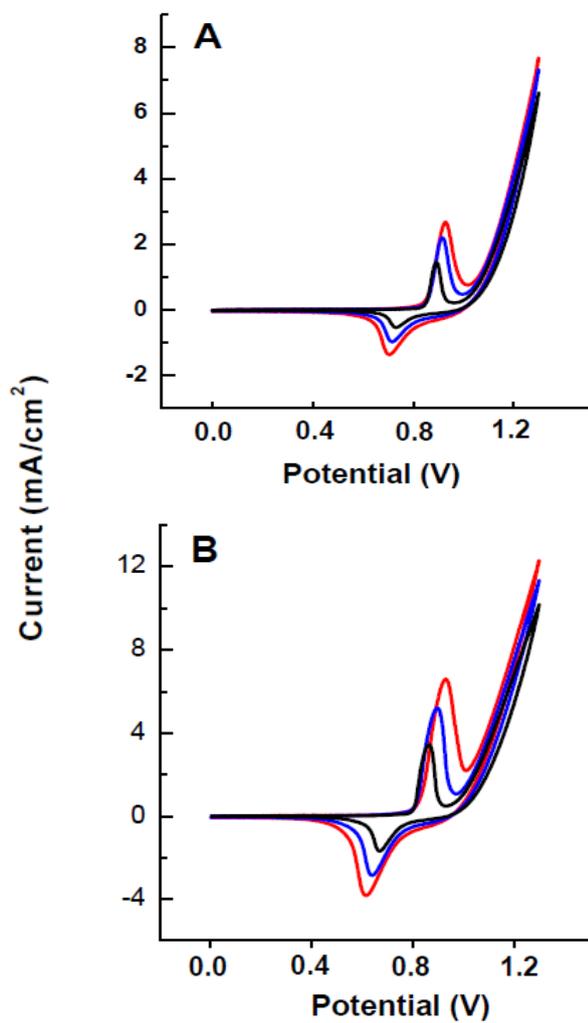


Fig. S2 CV scans of SWtacn-Bi (A) and SWtacn-OH (B) films recorded in 0.60 M NaBi buffer at scan rate of 25 mV/s (black), 50 mV/s (blue) and 75 mV/s (red).

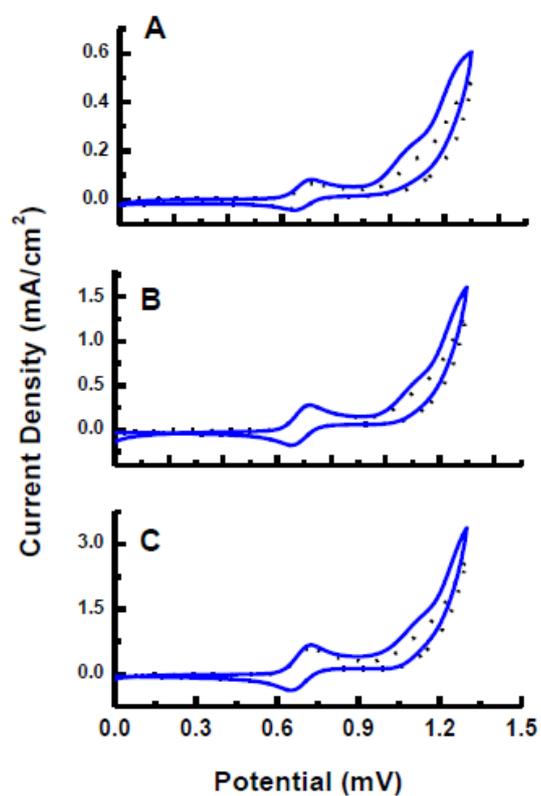


Fig. S3 Continuous cyclic voltammetry in 0.10 M Na₂SO₄ (pH = 9.2) for different concentrations of [Ni(tacn)₂]²⁺; 2.5 mM (A), 5.0 mM (B), 10 mM (C). Bold lines show the first scan and dotted line show last scan of the continuous CV scans.

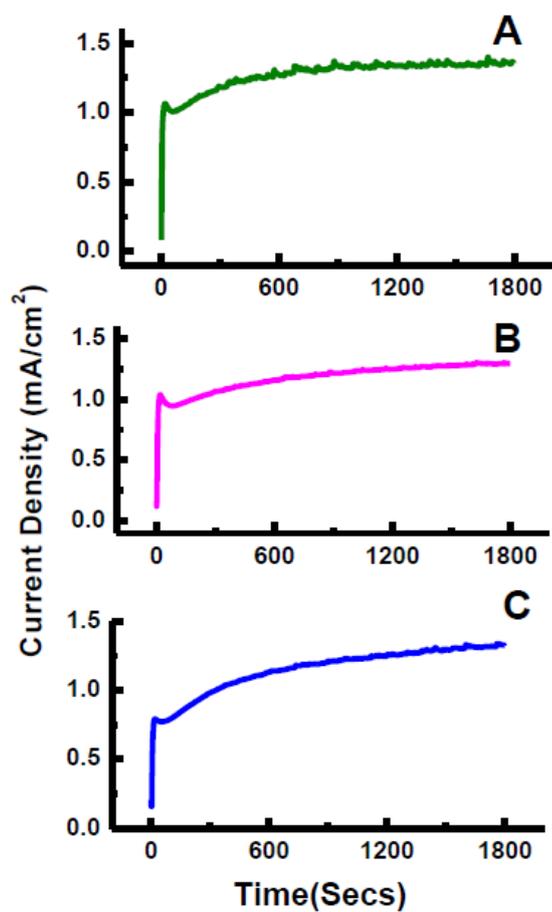


Fig. S4 Controlled potential electrolysis performed in 0.10 M NaBi buffer at 1.10 V vs Ag/AgCl with 1.0 mM of [Ni(tacn)₂]²⁺ (A), [Ni(tacn)]²⁺ (B) and [Ni(cyclen)]²⁺.

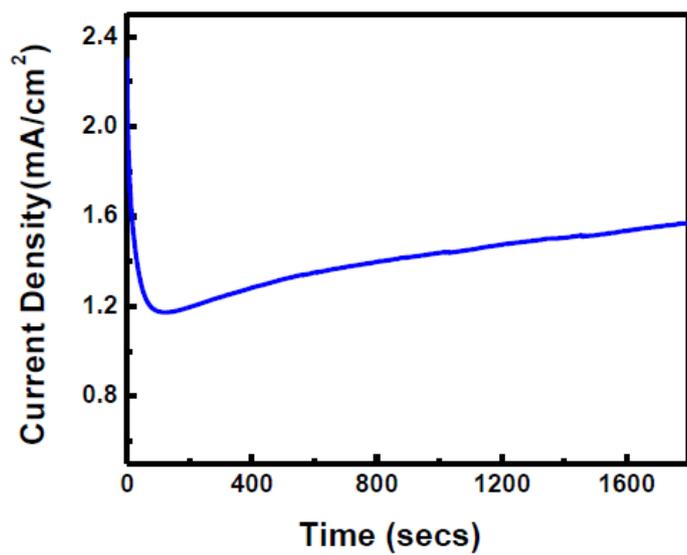
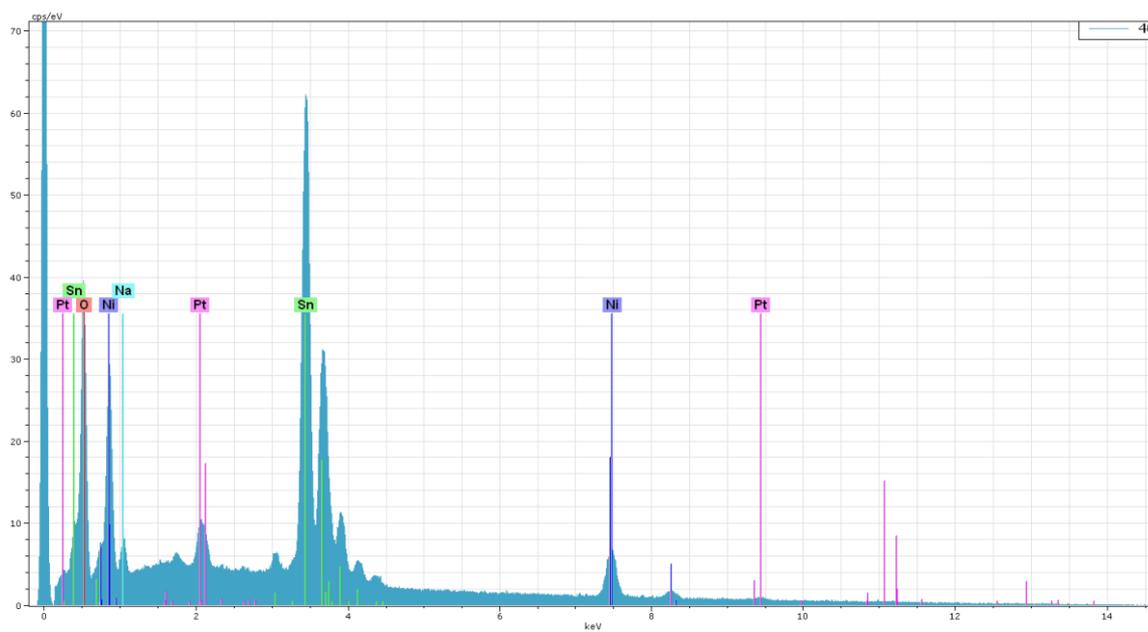
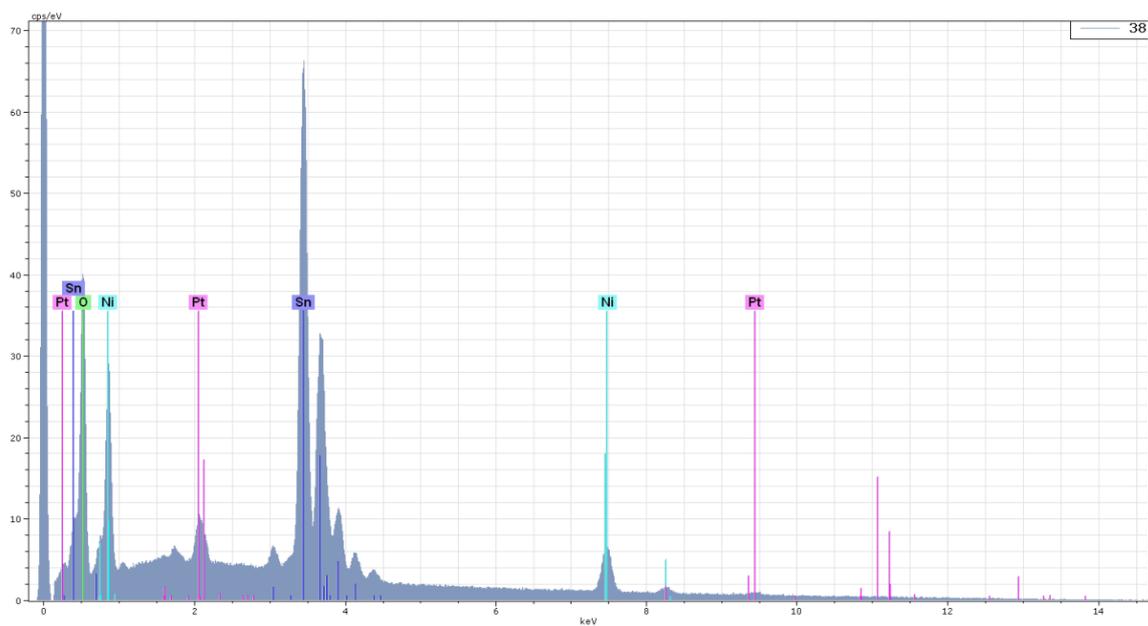


Fig. S5 Controlled potential electrolysis performed in 0.10 M NaOH at 0.75 V vs Ag/AgCl with 1.0 mM of $[\text{Ni}(\text{tacn})_2]^{2+}$



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Fig. S6 EDS of SWtacn-Bi (top) and SWtacn-OH (bottom) film before being used in water oxidation catalysis recorded at working distance of 6 mm. (Pt is due to the coating of the substrate; Sn, F and O from the substrate).

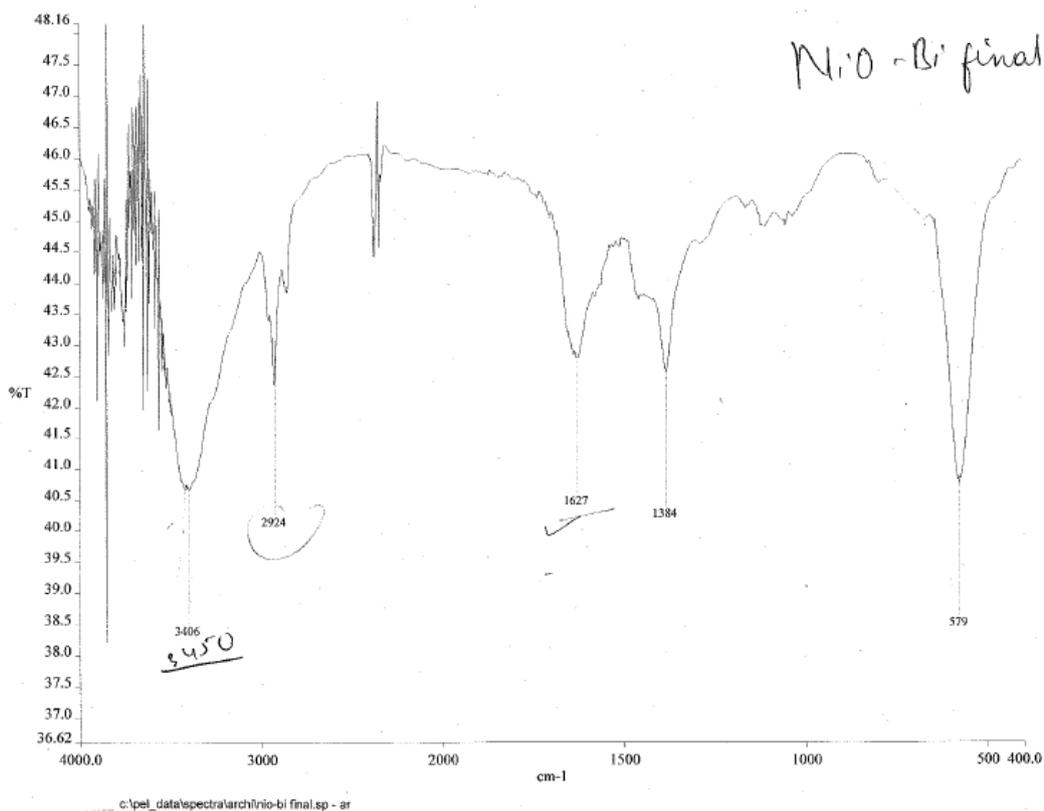
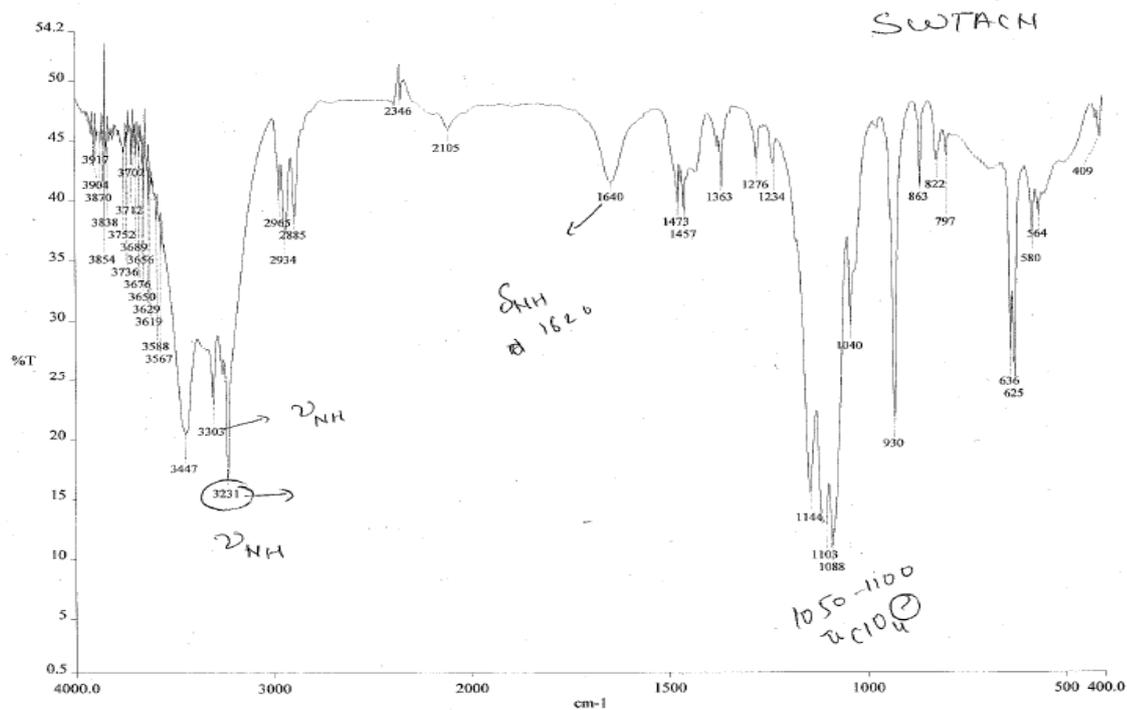


Fig. S7 Comparison of IR spectra of $[Ni(tacn)_2]^{2+}$ complex (top) and SWtacn-Bi (bottom) film recorded using dried KBr.

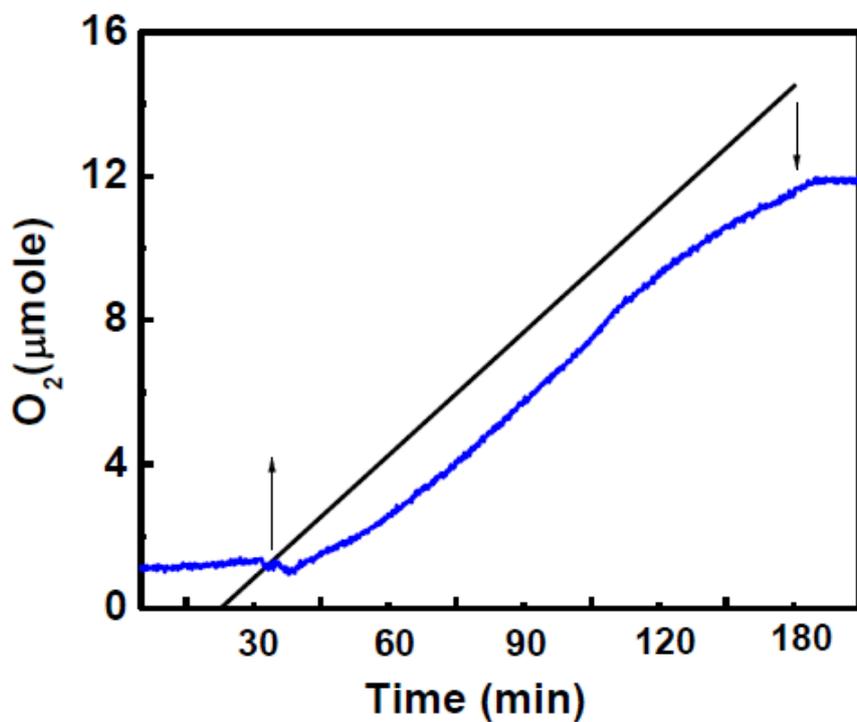


Fig. S8 Oxygen evolution measurement for a SWtacn-Bi film at constant potential of 1.10 V in 0.60M NaBi buffer in absence of Ni(II) in the electrolyte.

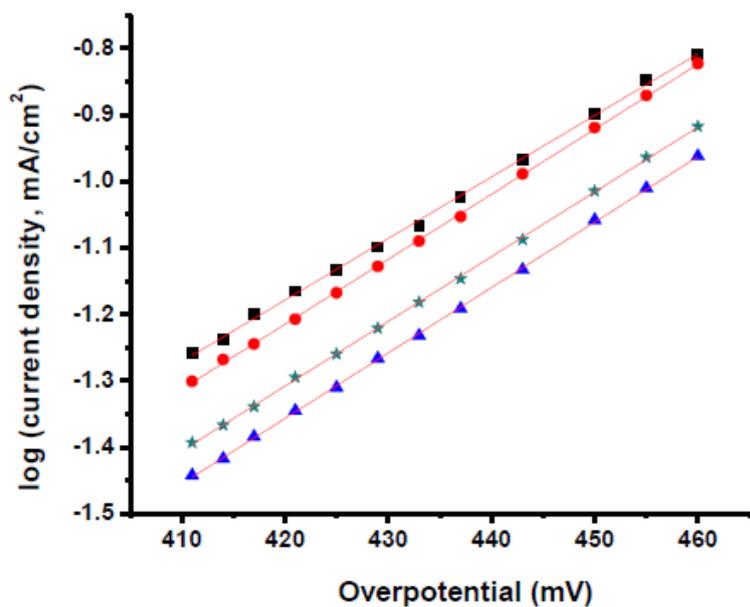


Fig. S9 Tafel plots obtained for different films in 0.60 M NaBi buffer, SWtacn-OH (square), SWtacn-Bi(circle), tacn (triangle) and cyclen (stars).

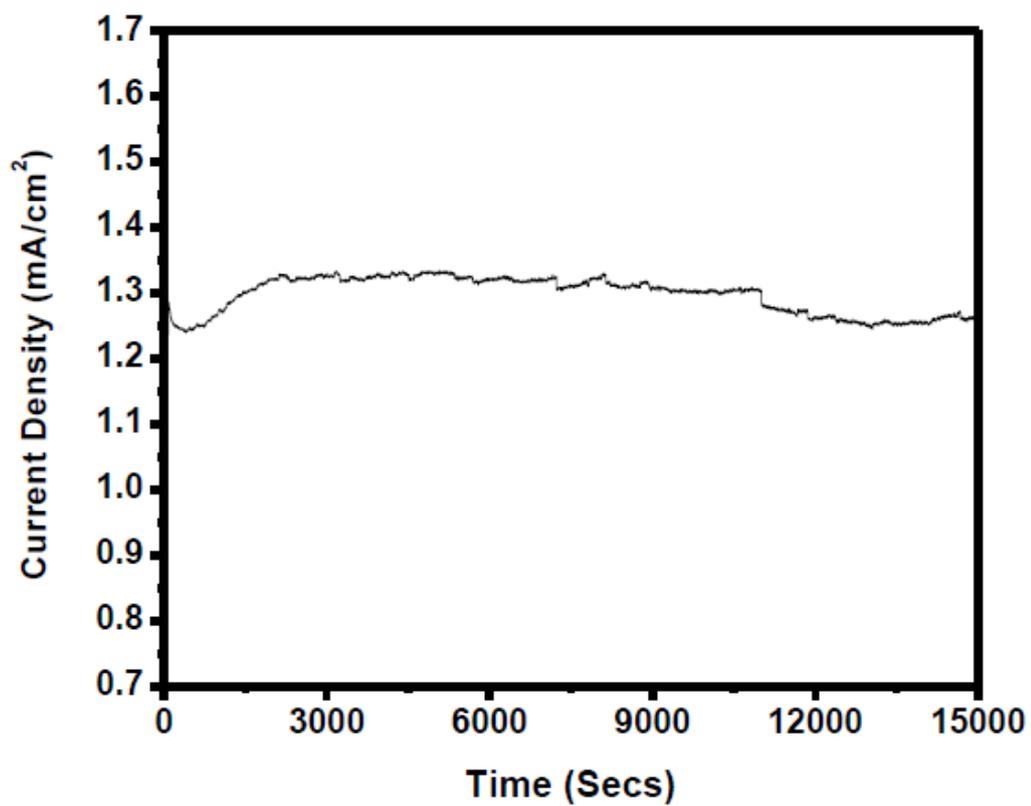


Fig. S10 Controlled potential electrolysis for SWtaccn-Bi film in 0.60 M NaBi buffer at applied potential of 1.10 V vs Ag/AgCl for a continuous period of four hours.

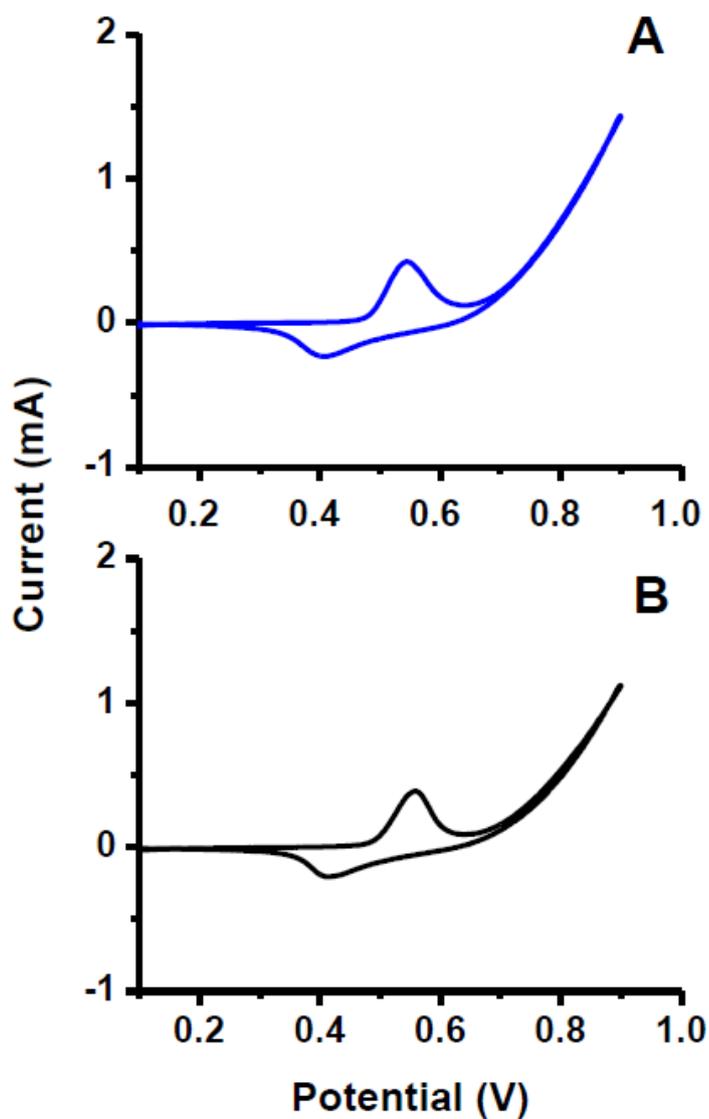


Fig. S11 CV of SWtacn-Bi film (A) and NiOx-aqua (B) in 0.10 M NaOH, recorded at scan rate of 10 mV/s.