Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.


**Supplementary Information**

# Enhanced photoelectrochemical water-splitting performance of $SrNbO_2N$ photoanodes by flux-assisted synthesis method and surface defect management

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**TableS1.** Detailed parameter for the synthesis of $SrNbO_2N$ particles

| Number | $SrCO_3$/g | $Nb_2O_5$/g | Ratio($SrCl_2$:KCl) | Temperature/℃ | post-Ar |
|---|---|---|---|---|---|
| **1(SNON800)** | **0.4097** | **0.455** | **1:1** | **800** | **Yes** |
| **2(SNON850)** | **0.4097** | **0.455** | **1:1** | **850** | **Yes** |
| **3(SNON900)** | **0.4097** | **0.455** | **1:1** | **900** | **Yes** |
| **4(SNON850-2)** | **0.4097** | **0.455** | **2:1** | **850** | **Yes** |
| **5(SNON850-2')** | **0.4097** | **0.455** | **2:1** | **850** | **No** |
| **6(SNON850-3)** | **0.4097** | **0.455** | **3:1** | **850** | **Yes** |

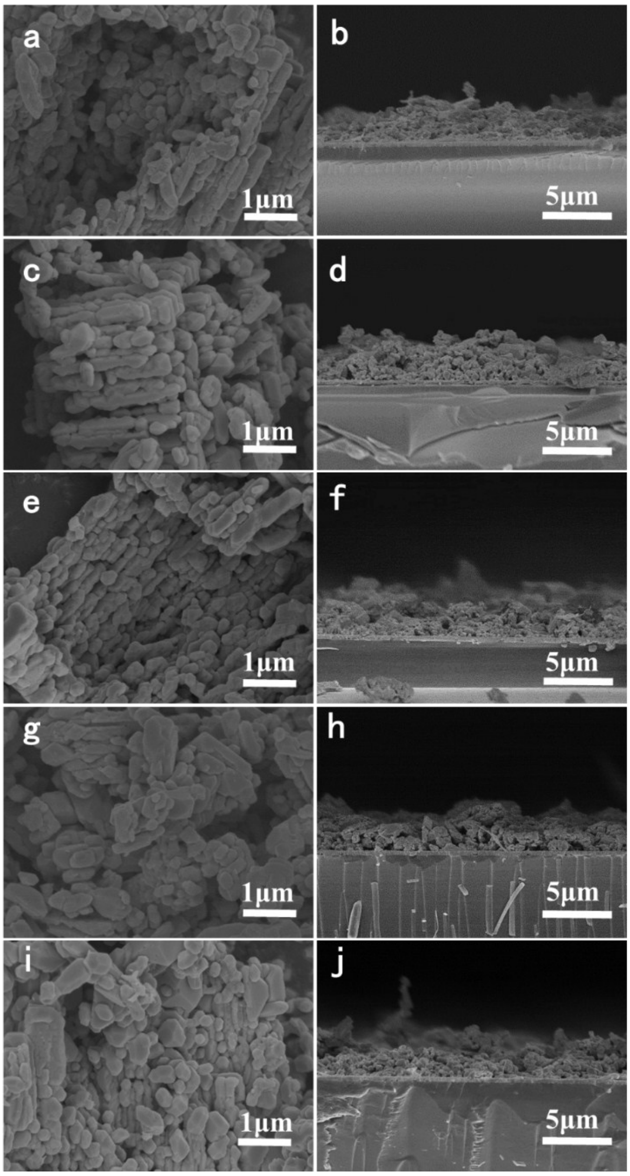


Fig. S1 (a)(c)(e)(g)(f) SEM images of SNON800, SNON850, SNON900, SNON850-2 and SNON850-3 particles, respectively

(b)(d)(f)(h)(j) SEM images of cross sections for SNON800, SNON850, SNON900, SNON850-2 and SNON850-3 photoanodes, respectively

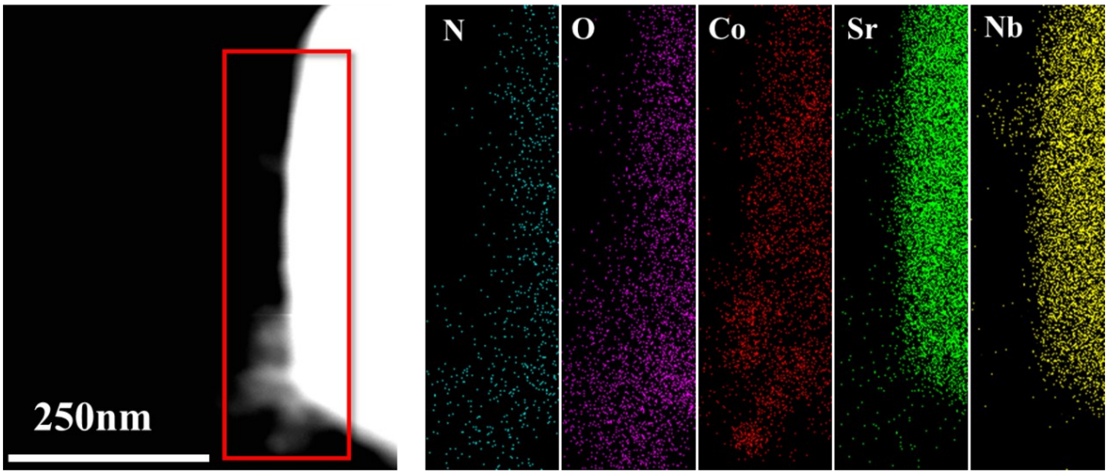


Fig. S2 TEM image and EDX elemental mapping images of N, O, Co, Sr and Nb for $SrNbO_2N$ particles.

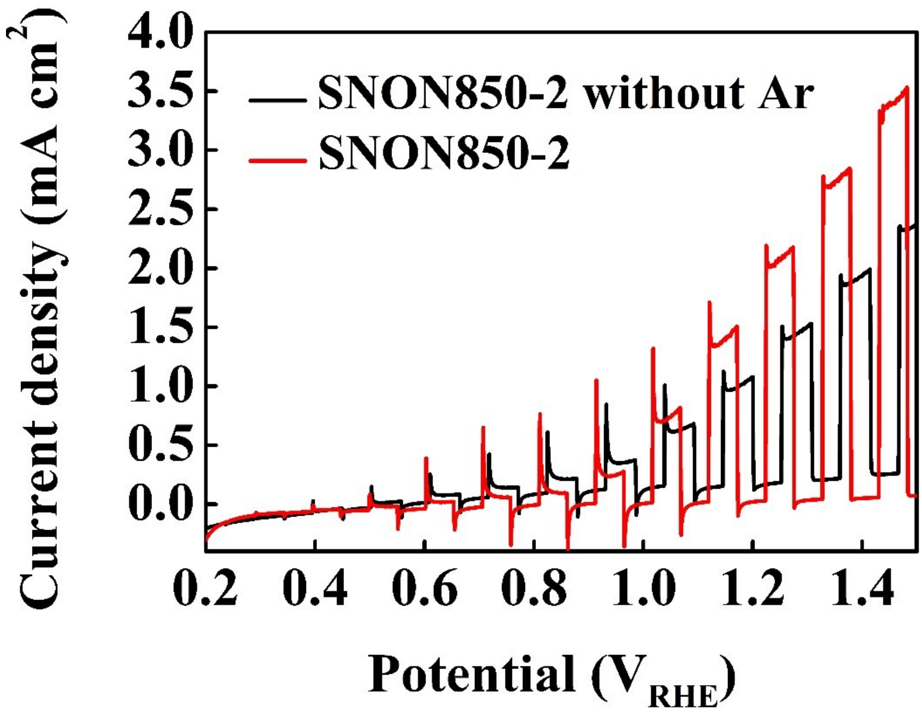


Fig. S3. Current-potential curves of SNON850-2 and SNON850-2 without Ar annealing

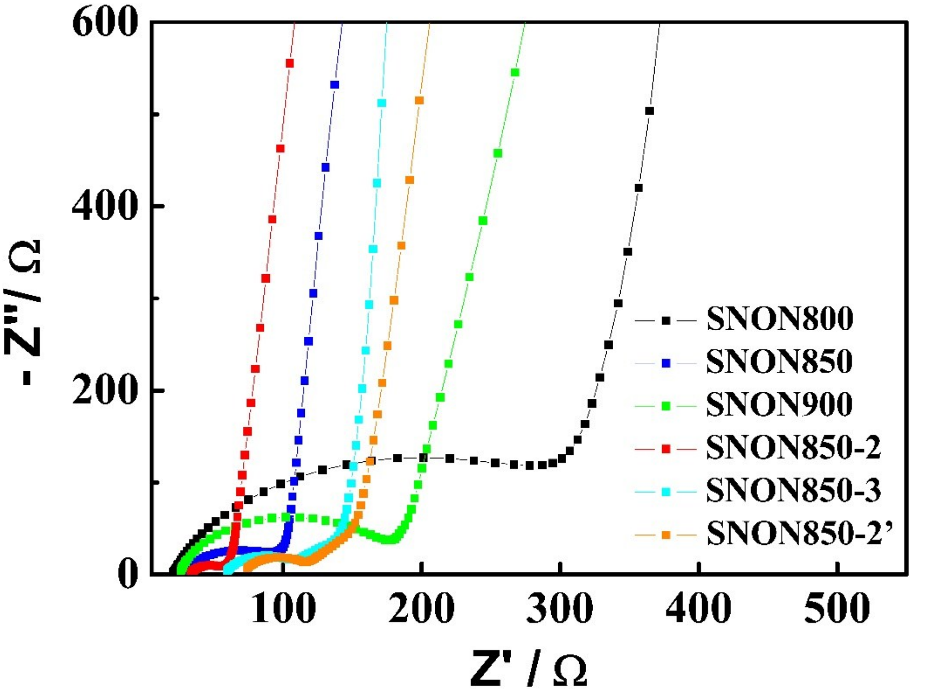


Fig. S4. The electrochemical impedance spectroscopy (EIS) of $SrNbO_2N$ series.

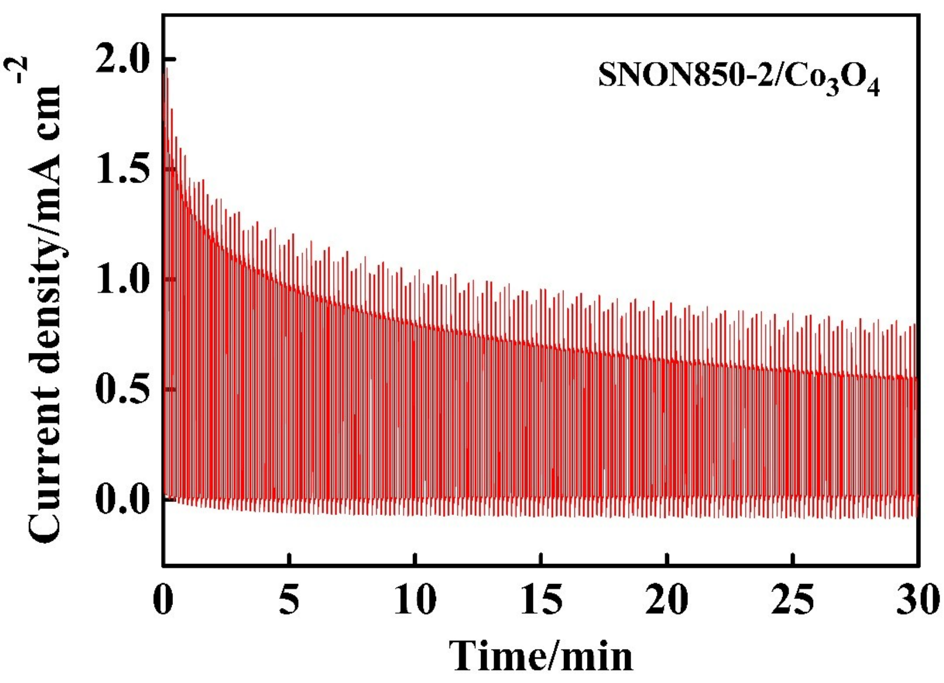


Fig. S5 Current-time curve for SNON850-2/$Co_3O_4$ photoanode performed at 1.23V versus RHE under simulated sunlight

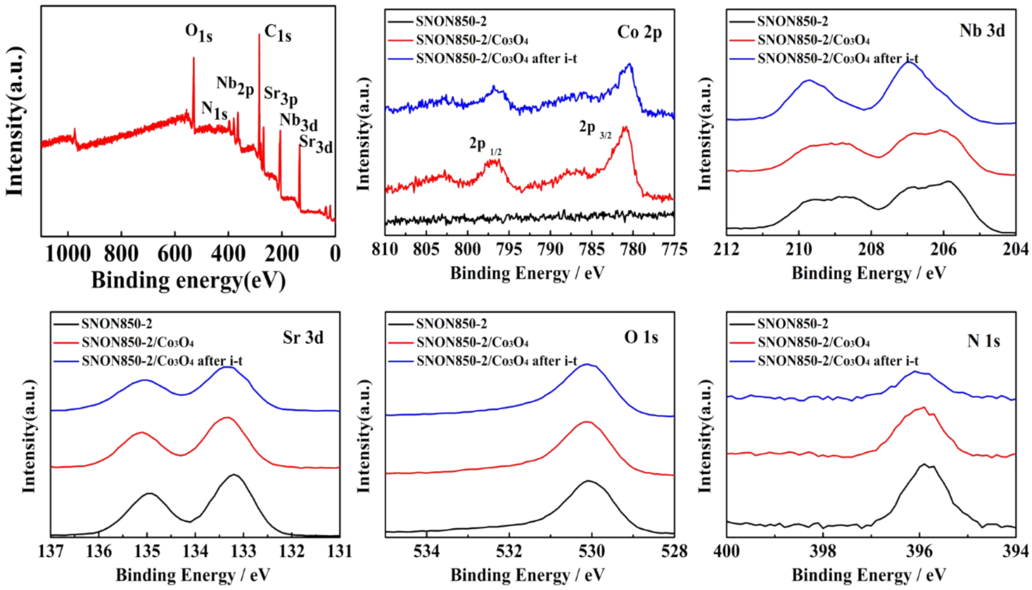


Fig. S6 XPS spectrum for SNON850-2， SNON-2/$Co_3O_4$ and SNON850-2/$Co_3O_4$ after photoelectrochemical measurement