Electronic supplementary information (ESI)

NH_3-Assisted Chloride Flux-Coating Method for Direct Fabrication of Visible-Light-Responsive $SrNbO_2N$ Crystal Layers

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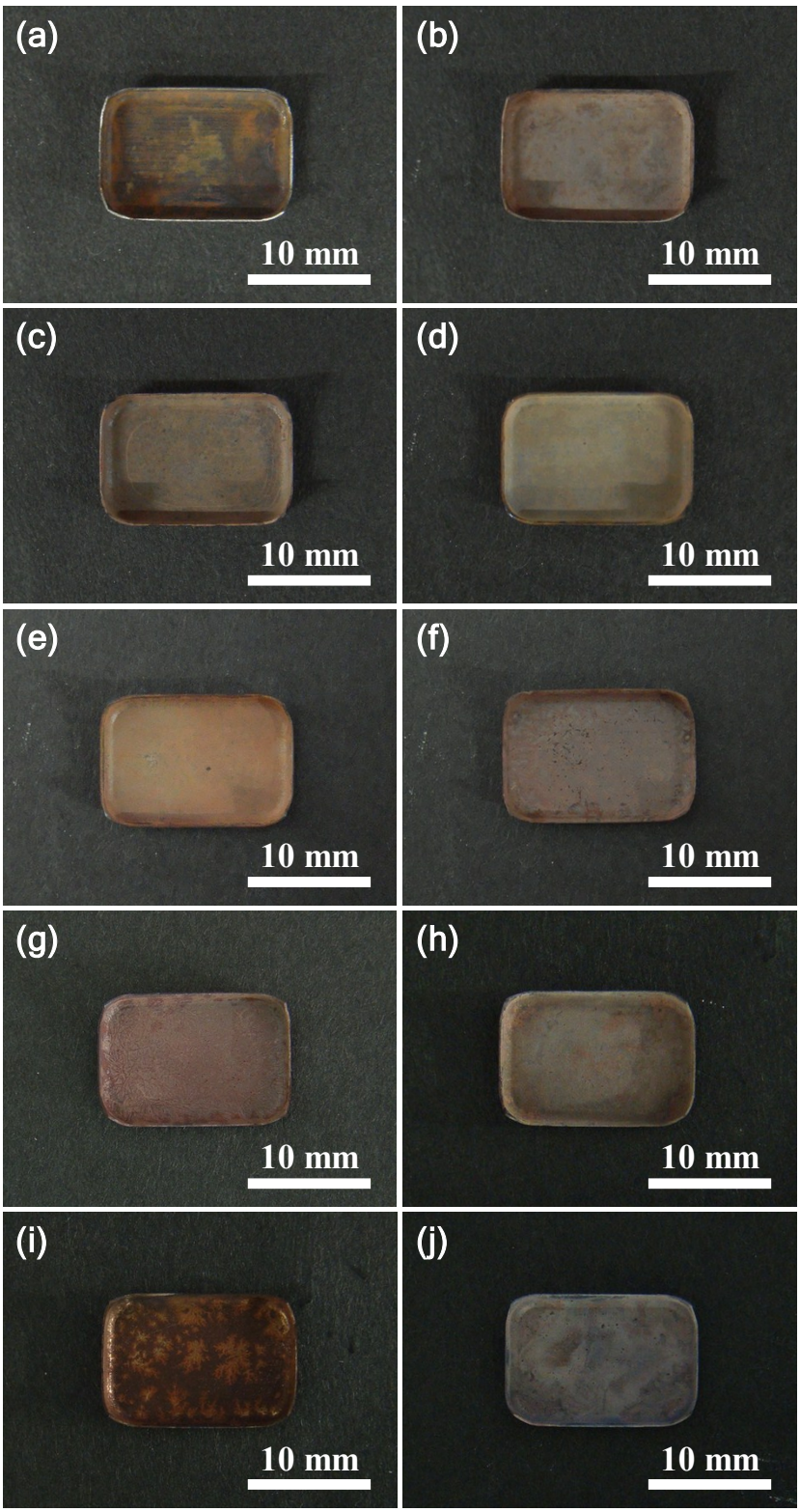

Fig. S1 Digital photographs of the crystal layers fabricated from different runs: (a) No. 1, (b) No. 2, (c) No. 3, (d) No. 4, (e) No. 5, (f) No. 6, (g) No. 7, (h) No. 8, (i) No. 9, and (j) No. 10.

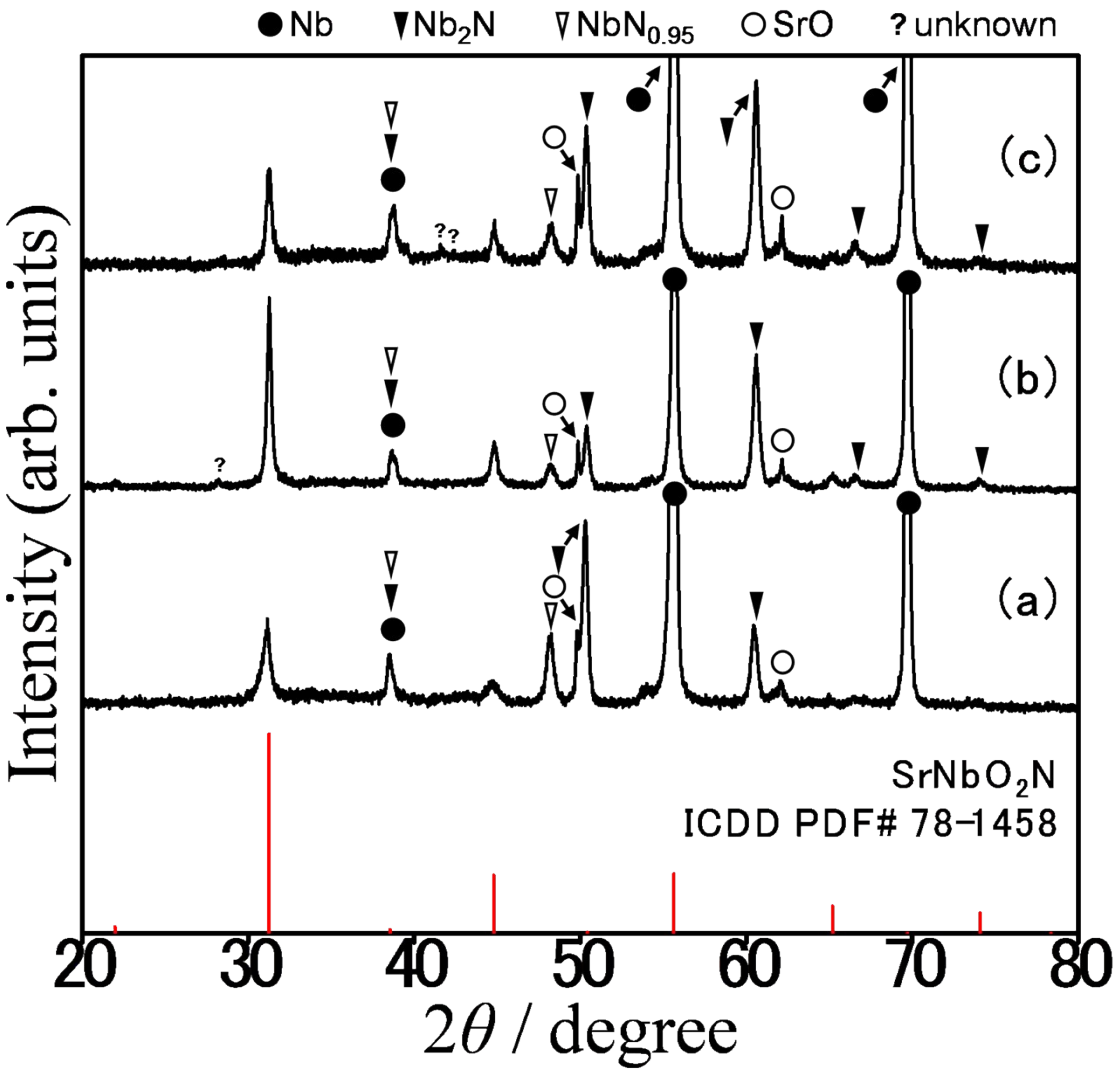

Fig. S2 XRD patterns of the crystal layers fabricated using NaCl-KCl flux with different strontium source:flux molar ratios of (a) 5:31, (b) 5:13, and (c) 5:7 at 850°C for 1 h.

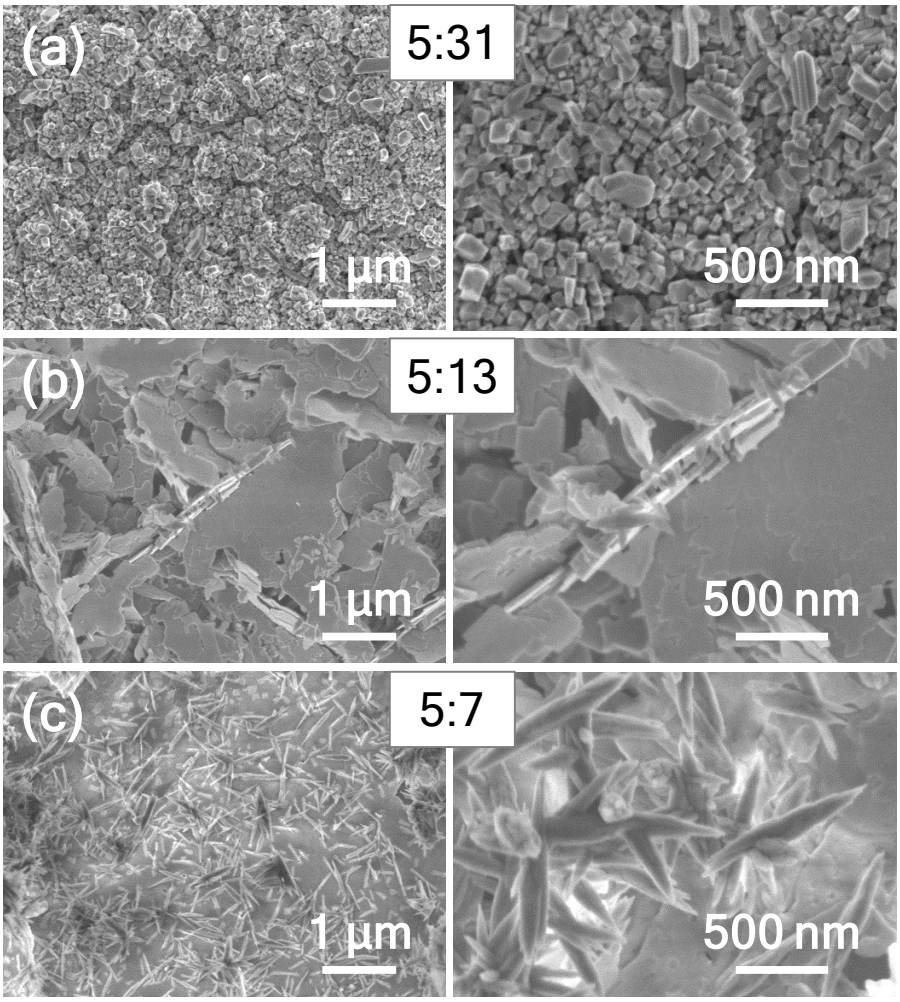

Fig. S3 Top-view SEM images of the crystal layers fabricated using NaCl-KCl flux with different strontium source:flux molar ratios of (a) 5:31, (b) 5:13, and (c) 5:7 at 850°C for 1 h.

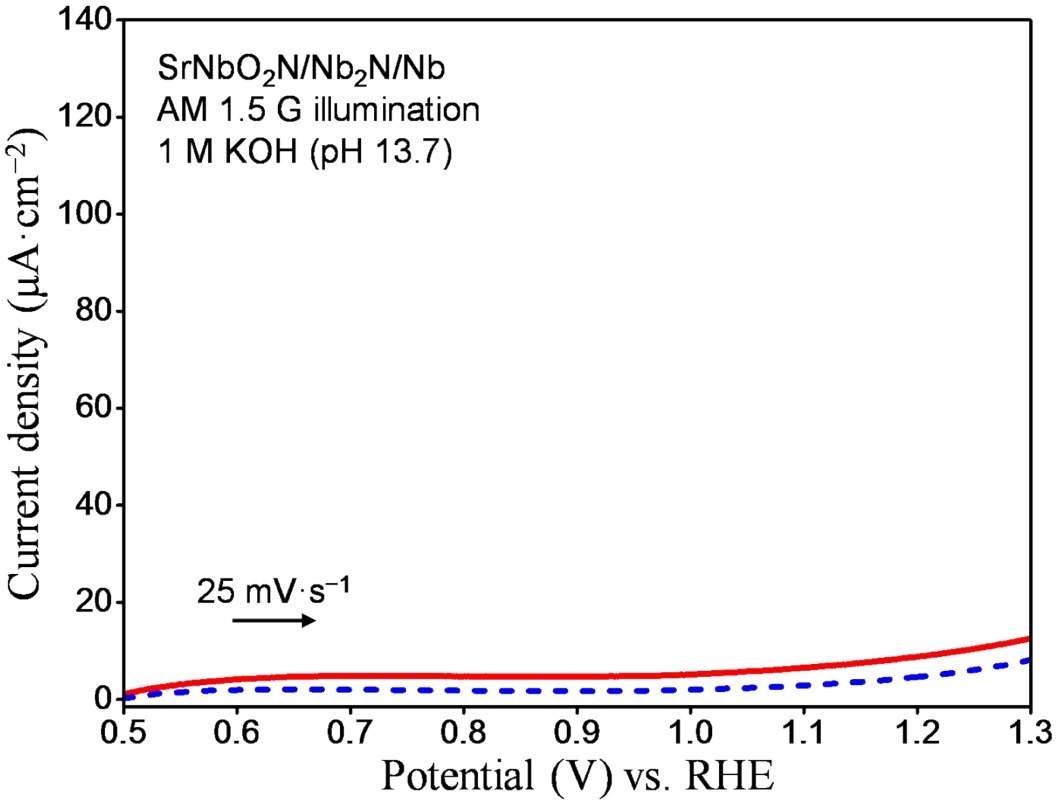

Fig. S4 Current–potential curve (second run) of $SrNbO_2N/Nb_2N/Nb$ photoanode in darkness (*blue* broken lines) and under AM 1.5 G simulated sunlight irradiation (*red* solid lines). The crystal layer was fabricated using NaCl-KCl flux with strontium source:flux molar ratio of 5:13 at 850°C for 1 h.

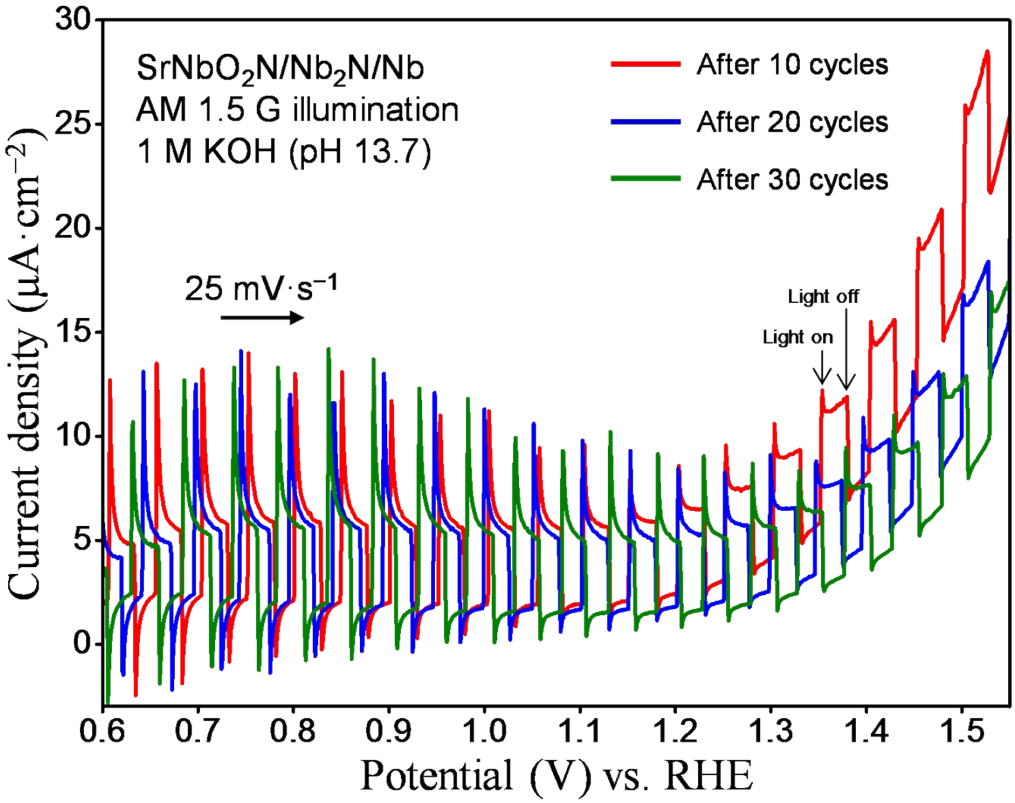

Fig. S5 Chopped current–potential curves of $SrNbO_2N/Nb_2N/Nb$ photoanode obtained after 10 (*red*), 20 (*blue*), 30 cycles (*green*) under AM 1.5 G simulated sunlight irradiation. The crystal layer was fabricated using NaCl-KCl flux with strontium source:flux molar ratio of 5:13 at 850°C for 1 h.

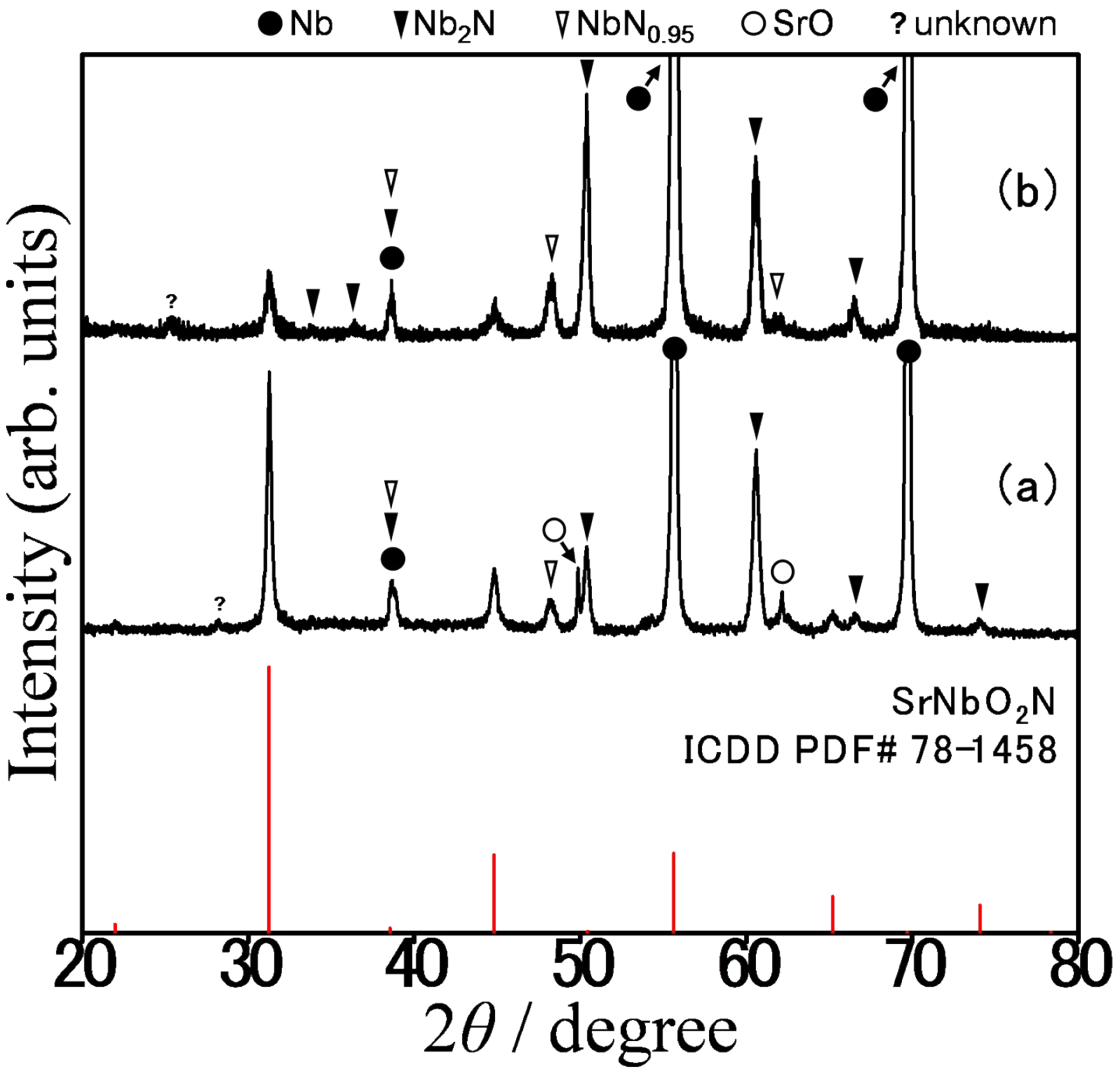

Fig. S6 XRD pattern of the crystal layer fabricated using NaCl-KCl flux with strontium source:flux molar ratios of 5:13 at 850°C for 1 h (a) before and (a) after the photoelectrochemical test.

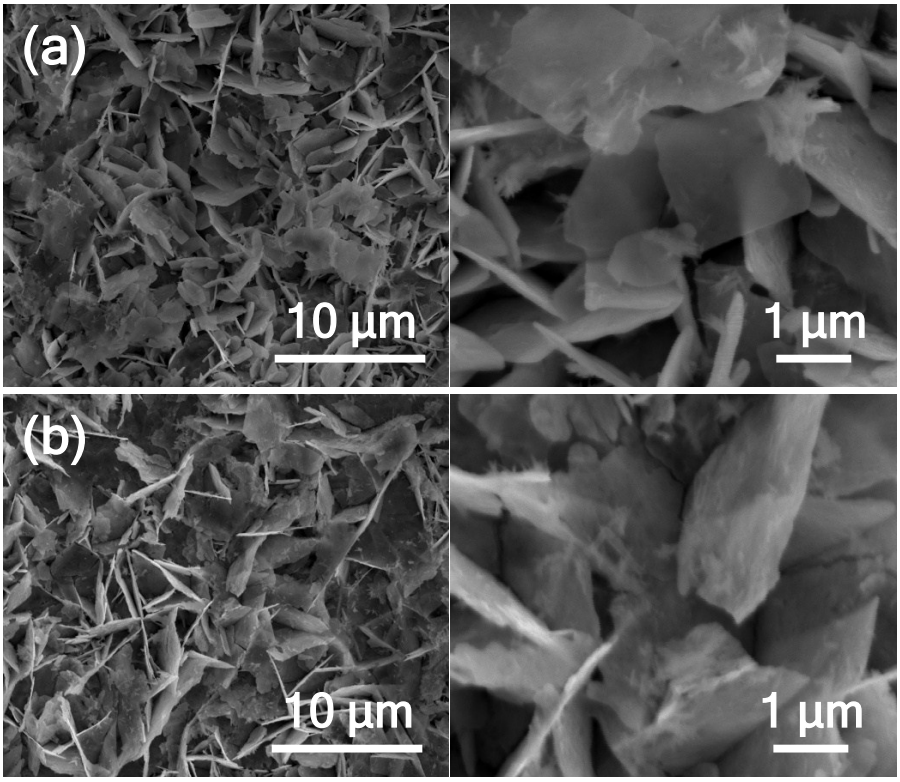

Fig. S7 Top-view SEM images of the crystal layer fabricated using NaCl-KCl flux with strontium source:flux molar ratios of 5:13 at 850°C for 1 h (a) before and (b) after the photoelectrochemical test.

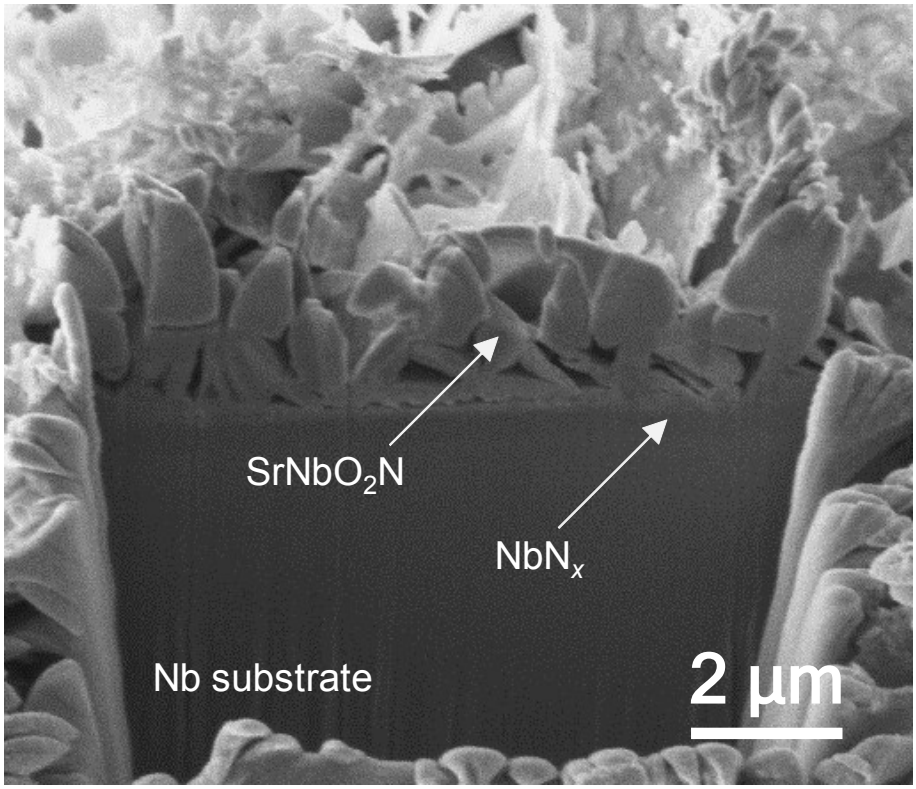

Fig. S8 45°-tilted cross-sectional-view SEM image of the crystal layer fabricated using NaCl-KCl flux with strontium source:flux molar ratio of 5:13 at 850°C for 1 h after the photoelectrochemical test.

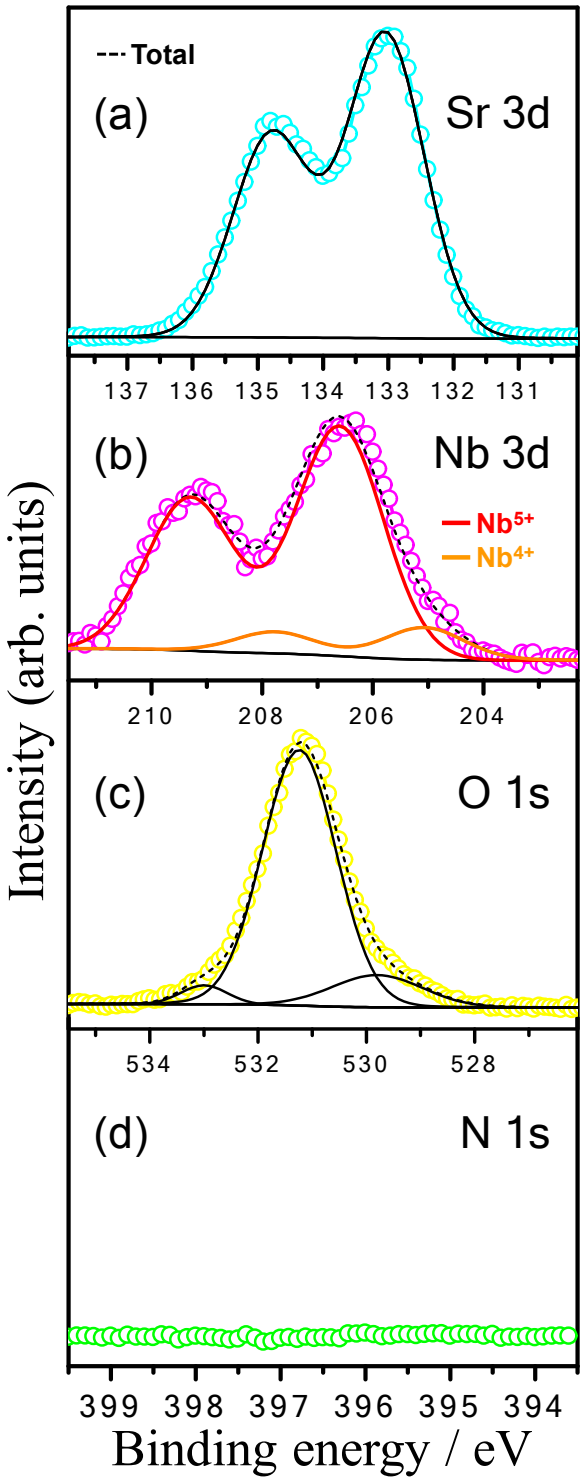

Fig. S9 (a) Sr 3d, (b) Nb 3d, (c) O 1s, and (d) N 1s XPS core-level spectra of the crystal layer fabricated using NaCl-KCl flux with strontium source:flux molar ratio of 5:13 at 850°C for 1 h after the photoelectrochemical test.