Supporting Information

Two-step photocatalytic water splitting into H₂ and O₂ using layered metal oxide KCa₂Nb₃O₁₀ and its derivatives as O₂-evolving photocatalysts with IO₃⁻/I⁻ or Fe³⁺/Fe²⁺ redox mediator

Hajime Suzuki, Osamu Tomita, Masanobu Higashi, Ryu Abe*

a Graduate School of Engineering, Kyoto University, Katsura, Nishikyo-ku, Kyoto 615-8510, Japan
b JST-CREST, Sanbancho 5, Chiyoda-ku, Tokyo 102-0075, Japan

E-mail: ryu-abe@scl.kyoto-u.ac.jp
Fig. S1 TEM images of (a) exfoliated nanosheets and (b) ex-Ca$_2$Nb$_3$O$_{10}$/K$^+$.  

Fig. S2 XRD patterns of ex-Ca$_2$Nb$_3$O$_{10}$/K$^+$(500 °C) and after water treatment.  

Fig. S3 Time courses of O$_2$ evolution over 100 mg of H$^+$/KCa$_2$Nb$_3$O$_{10}$ and ex-Ca$_2$Nb$_3$O$_{10}$/K$^+$/H$^+$, in 5 mM NaIO$_3$ aqueous solution under UV light irradiation (λ > 300 nm, Xe lamp).
Fig. S4 Time courses of O$_2$ evolution over ex-Ca$_2$Nb$_2$O$_{10}$/K$^+$ samples loaded with 0.3 wt% of various metal oxides (PtO, RuO$_2$, IrO$_2$, Rh$_2$O$_3$, CoO$_x$) in 5 mM NaIO$_3$ aqueous solution under UV light irradiation ($\lambda > 300$ nm, Xe lamp).

Fig. S5 CV profiles of FTO substrates loaded with various metal oxides in the presence of H$_2$O (360 mL).
Fig. S6 CV profiles of FTO substrates loaded with various metal oxides in the presence of Fe$^{3+}$ (5 mM, pH 2.3).

Fig. S7 Time course of gas evolution over Pt/SrTiO$_3$:Rh from KI aqueous solution (5 mM, pH=12.0) under UV light irradiation ($\lambda > 300$ nm, Xe lamp).