Supporting Information

Design of nitrogen-doped layered tantalates for non-sacrificial and selective hydrogen evolution from water under visible light

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Fig. S1 XRD patterns of RbLaTa$_2$O$_7$ before and after heating under NH$_3$ flow at 973–1173 K for 6 h.

Fig. S2 XRD patterns of H$^+$/RbLaTa$_2$O$_7$, RbLaTa$_2$O$_7$$_{7-x}$N$_y$(2.4) and H$^+$/RbLaTa$_2$O$_7$$_{7-x}$N$_y$(2.4).
Fig. S3 Diffuse reflectance spectra of $H^+/\text{RbLaTa}_2O_{7-x}N_y$ (2.4), Pt(in)-$H^+/\text{RbLaTa}_2O_{7-x}N_y$ (2.4) and Pt(out)-$H^+/\text{RbLaTa}_2O_{7-x}N_y$ (2.4).

Fig. S4 XP spectra of Pt(in)-$H^+/\text{RbLaTa}_2O_{7-x}N_y$ (Rb: 2.4), and Pt(out)-$H^+/\text{RbLaTa}_2O_{7-x}N_y$ (Rb: 2.4).
Fig. S5 TEM images of Pt(in) and Pt(out)-H⁺/RbLaTa₂O₇₋ₓNₓ (2.4).

Fig. S6 Diffuse reflectance spectra of H⁺/RbLaTa₂O₇₋ₓNₓ (1.2) and rates of H₂ evolution over Pt(in)-H⁺/RbLaTa₂O₇₋ₓNₓ (1.2) from MeOH aqueous solution (Xe lamp, cut off filter: U–35, L–42, Y–44, Y–46, Y–50, O–54).
Fig. S7 Diffuse reflectance spectra of Pt(in)-H⁺/RbLaTa₂O₇₋ₓNₓ (2.4) before and after H₂ evolution from 0.1 M KI aqueous solution.

Fig. S8 XRD patterns of Pt(in)-H⁺/RbLaTa₂O₇₋ₓNₓ (2.4) before and after H₂ evolution from 0.1 M KI aqueous solution.