Supporting Information

The enhanced visible light photocatalytic water-splitting activity over $LaVO_4$/g-C_3N_4 with oxygen defect

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Sample characterization.

The X-ray diffractometer (XRD) (modelD/max RA,RigakuCo., Japan) was carried out to analyze the crystalline phases of the prepared materials with CuKα radiation. The surface properties were investigated by using XPS (X-Ray photoelectron spectroscopy, Thermo ESCALAB 250, USA) with Al Ka X-rays radiation. The morphology was observed by a transmission electron microscope (TEM, JEM-6700F, Japan). Ultraviolet-visible (UV-Vis, UV-2700, Japan) absorption spectra was measured by a UV-Visible spectrometer. Photoluminescence spectra (PL, FS-2500, Japan) was investigated by using a fluorescence spectrometer equipped with the Xe lamp. The photoelectric current (PC) and electrochemistry impedance spectroscopy (EIS) response were measured by an electrochemical workstation (CHI660E, China). The prepared photocatalytic material was coated onto the FTO glass electrode for the working electrode. Platinum foil was used for the counter electrode, and Ag/AgCl was prepared as the reference electrode in 0.1 M Na_2SO_4 aqueous solution. The photocurrent was measured at a bias voltage of 0.02 V and the frequency range was from 0.01 Hz to 100 kHz under 40 s light on/off cycles of chopped illumination with a

Xe arc lamp.

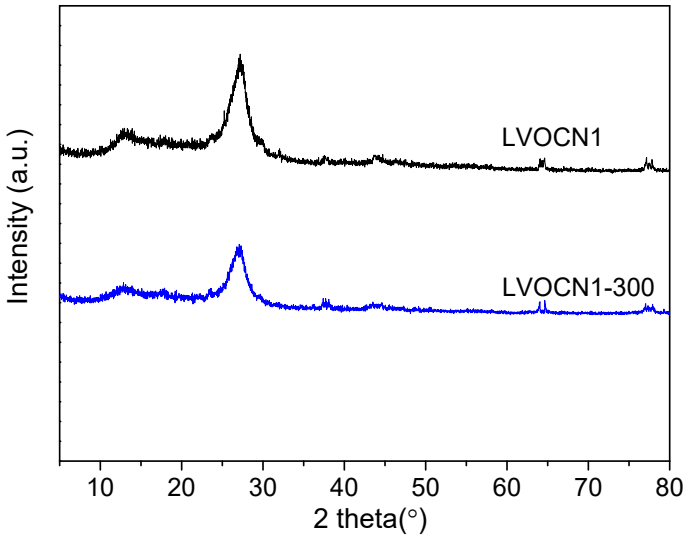

Figure S1 XRD patterns of LaVOCN1 and LaVOCN1-300.

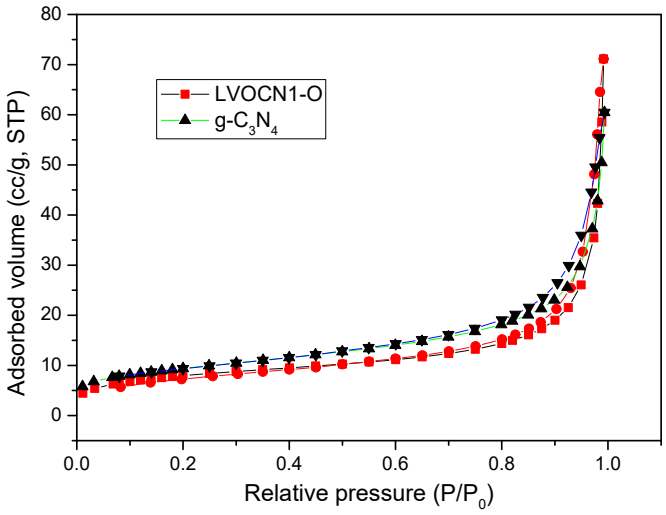

Figure S2 the N_2 adsorption/desorption isotherms of g-C_3N_4 and LVOCN1-O.

Table S1. Atomic relative content (%) of prepared samples from XPS characterization

Sample	g-C_3N_4	LaVOCN1	LaVOCN1-300
N	52.66	43.93	44.34
C	44.28	51.64	51.02
O	3.05	4.37	4.12

La	-	0.01	0.01
V	-	0.05	0.51

Table S2. Binding energy (BE) and relative content (RC) of C 1s for prepared samples

sample	$g\text{-}C_3N_4$		LVOCN1		LVOCN1-300	
	BE(eV)	RC(%)	BE(eV)	RC(%)	BE(eV)	RC(%)
C-C	284.8	19.93	284.8	36.35	284.8	27.50
N=C–N	288.1	74.32	288.3	57.83	288.2	66.66
π-excitation	293.9	5.75	294.5	5.82	294.2	5.84

Table S3. Binding energy (BE) and relative content (RC) of N 1s for prepared samples

sample	$g\text{-}C_3N_4$		LVOCN1		LVOCN1-300	
	BE(eV)	RC(%)	BE(eV)	RC(%)	BE(eV)	RC(%)
N=C–N	398.6	62.73	398.6	43.30	398.4	41.02
N doping	399.2	21.10	399.2	32.88	399.1	32.11
amino function	400.6	14.84	400.6	18.78	400.6	17.68
charging effects	404.5	1.33	405.0	5.04	404.5	9.18

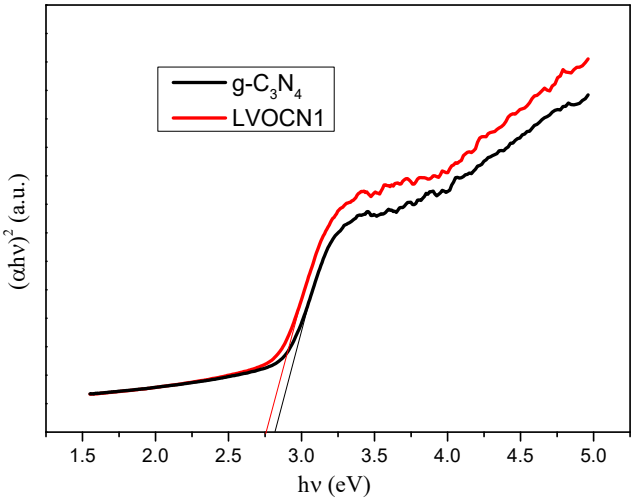

Figure S3 Plots of $(\alpha h\upsilon)^2$ versus photon energy ($h\upsilon$) for the band gap energies of g-C_3N_4 and LVOCN1.