Electronic Supplementary Information

Synthesis of gallium oxynitride nanoparticles through hydrothermal reaction under a presence of acetylene black and their photocatalytic NO_x decomposition

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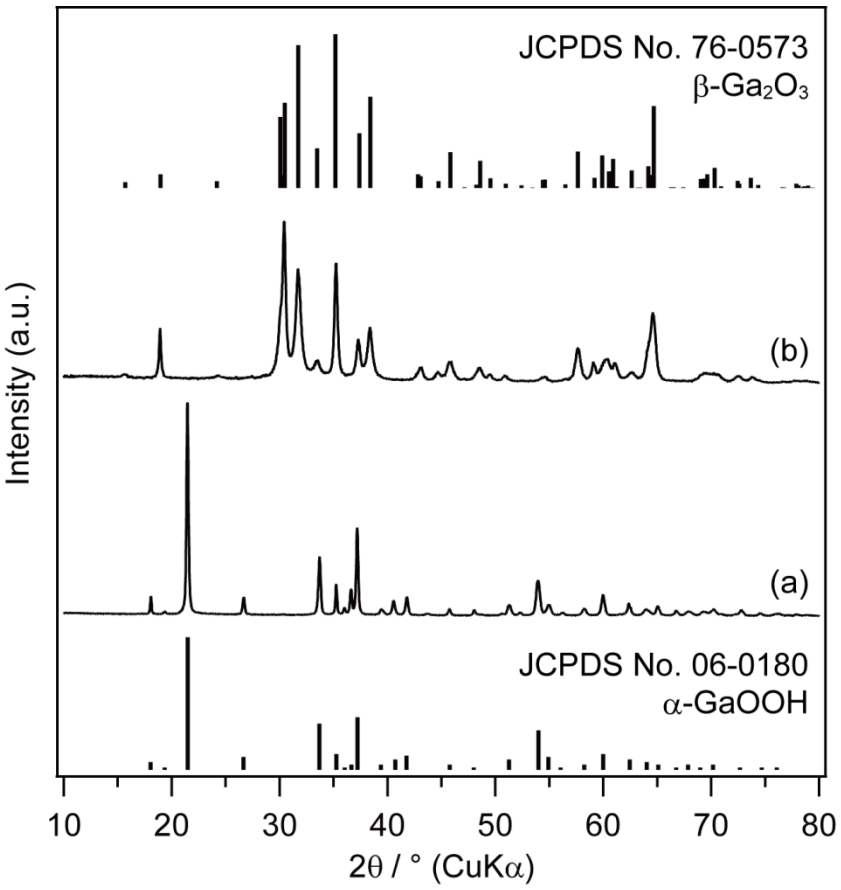

Fig. S1 XRD patterns of (a) GaOOH_ noAB and (b) Ga_2O_3_noAB.

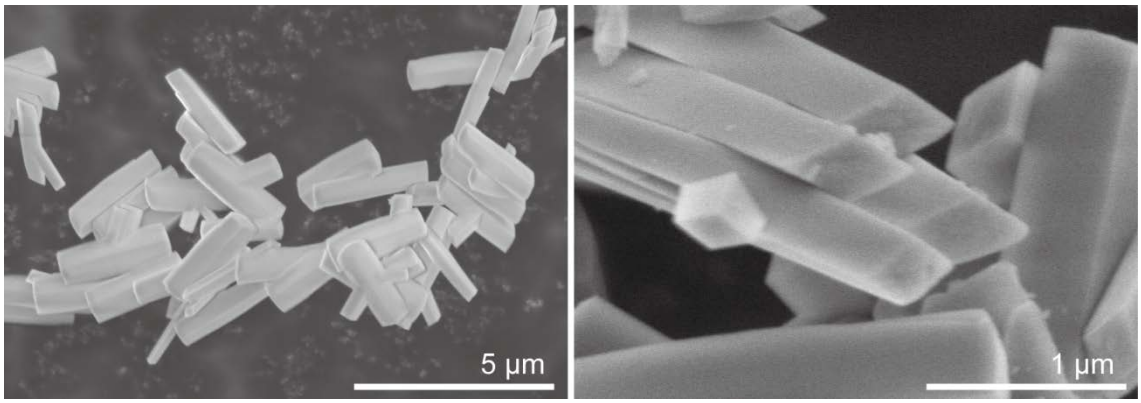

Fig. S2 SEM images of GaOOH_noAB.

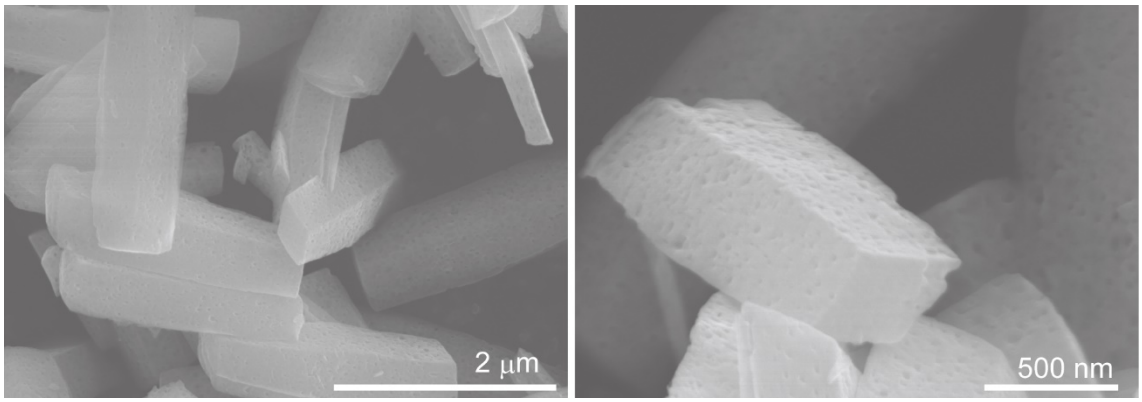

Fig. S3 SEM images of Ga_2O_3_noAB.

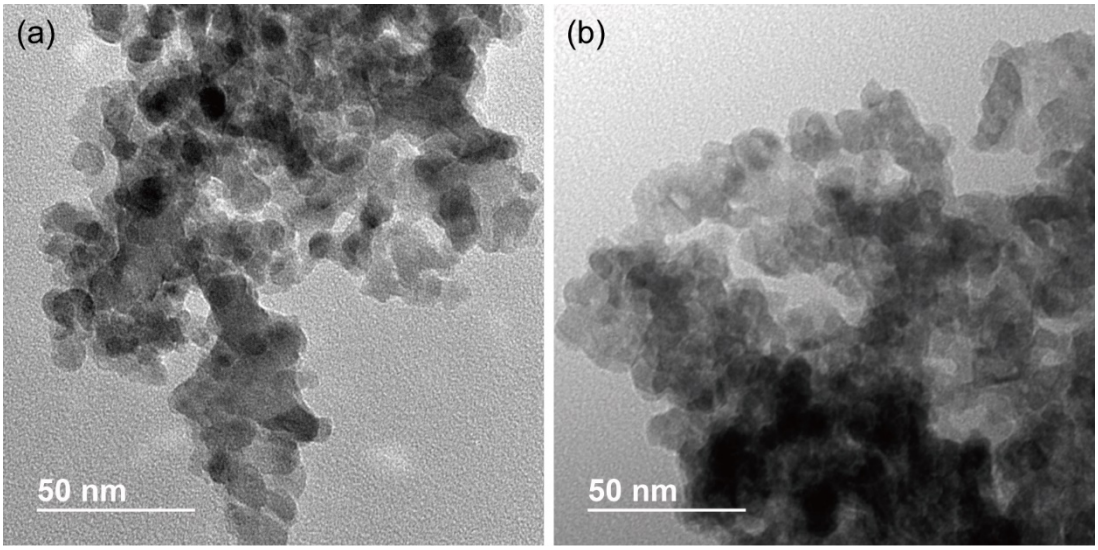

Fig. S4 TEM image of (a) the sample which obtained through immerse of $Ga(NO_3)_3$ aqueous solution into acetylene black, drying, and calcination, and (b) its nitrided sample at 850 °C for 3 h.

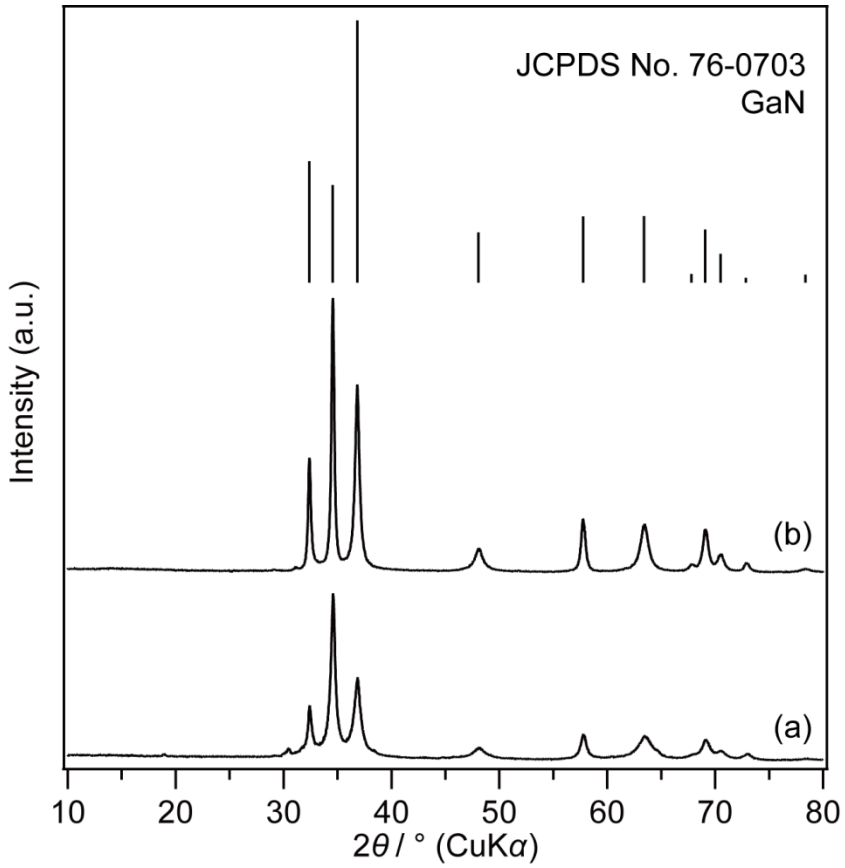

Fig. S5 XRD patterns of GaON_noAB_850_3 and GaON_noAB_850_10.

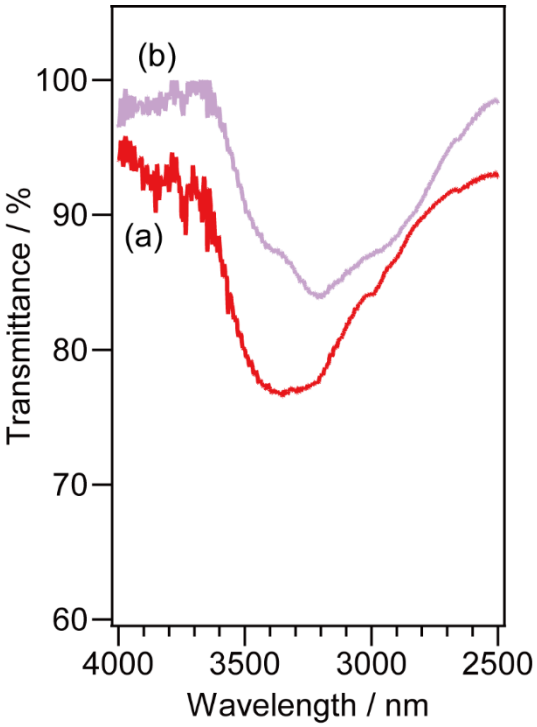

Fig. S6 FT-IR spectra of (a) GaON_AB_850_3 and (b) GaON_noAB_850_3.

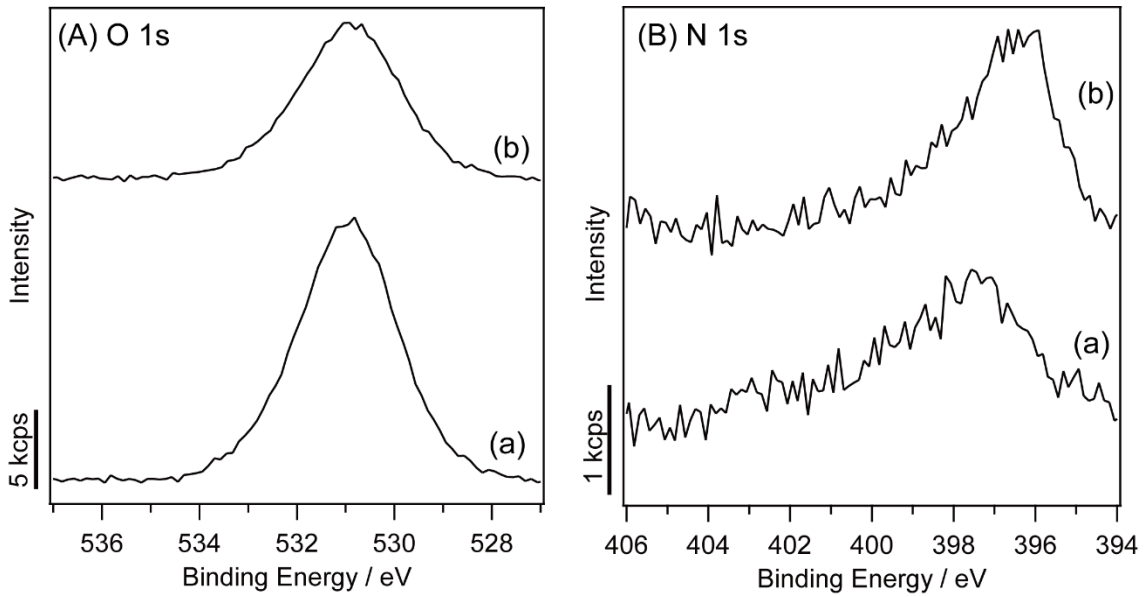

Fig. S7 Narrow-scan XPS spectra for (A) O 1s and (B) N 1s of (a) GaON_AB_850_3 and (b) GaON_noAB_850_3. The data were collected after Ar-sputtering for removal of the adsorbed species. The O/N ratios of GaON_AB_850_3 and GaON_noAB_850_3 are 5.5 and 3.3, respectively.

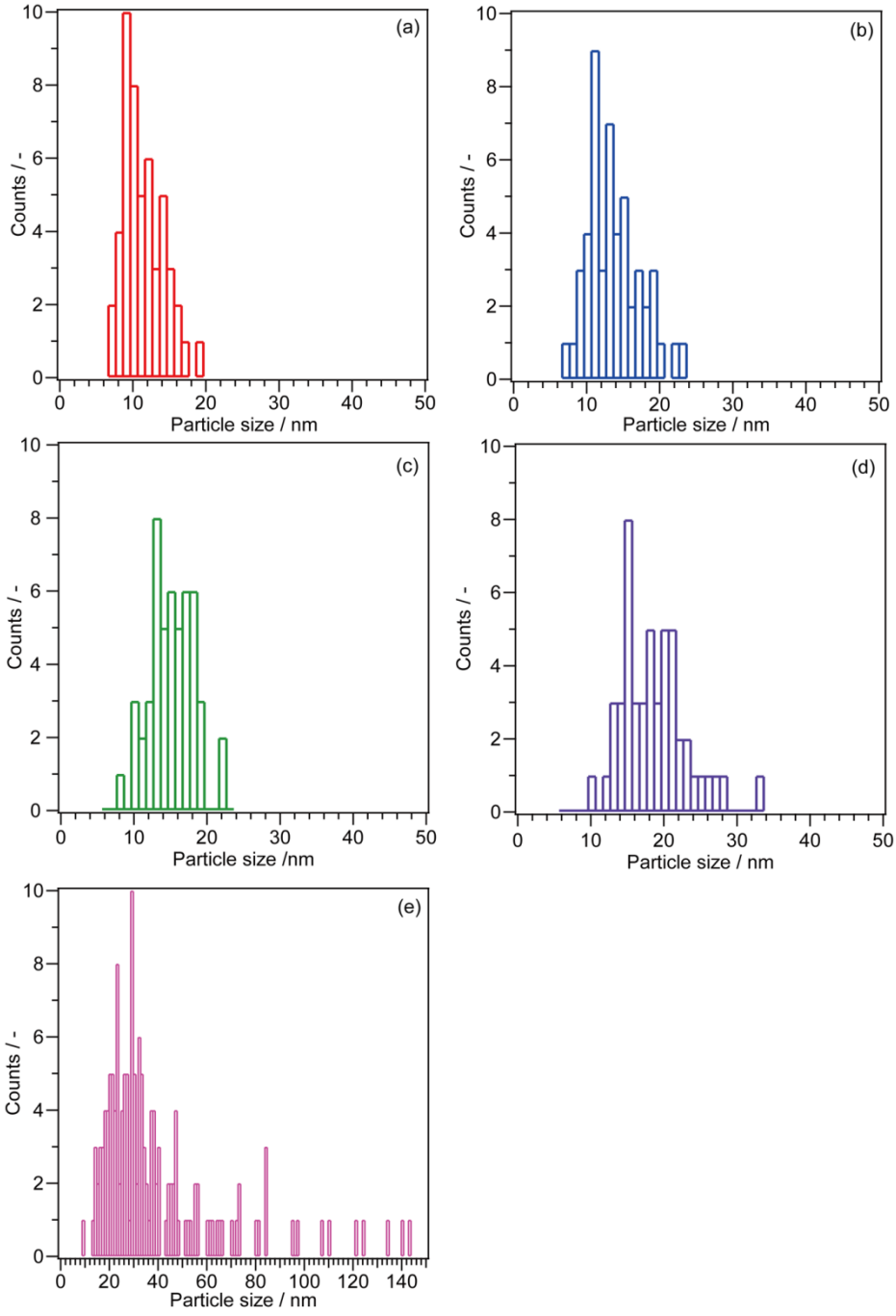

Fig. S8 Particle size distributions of (a) GaON_AB_850_3, (b) GaON_AB_850_10, (c) GaON_AB_950_3, (d) GaON_AB_950_10, and (e) GaON_AB_1050_3. The distributions were collected by measurement of the size of particles in the TEM images.

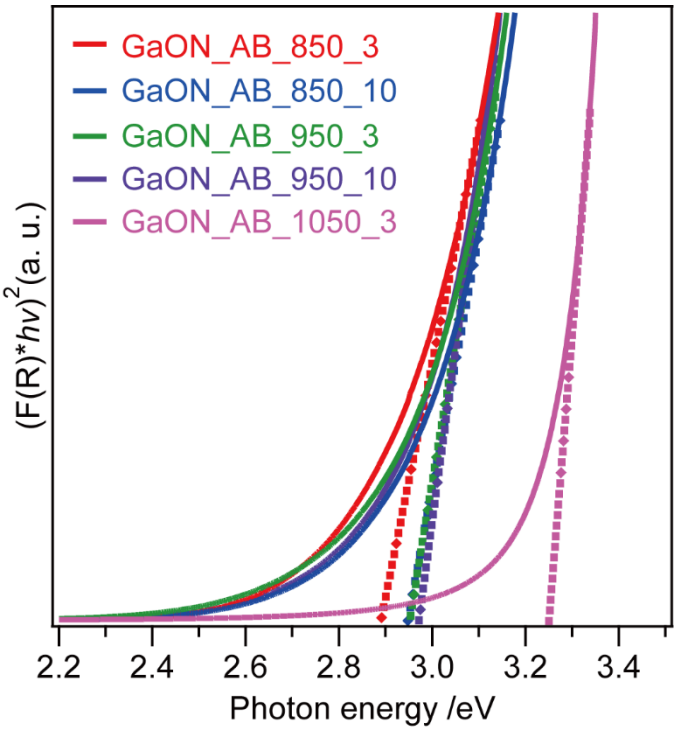

Fig. S9 Tauc plots of the samples obtained by nitridation of Ga_2O_3_AB.

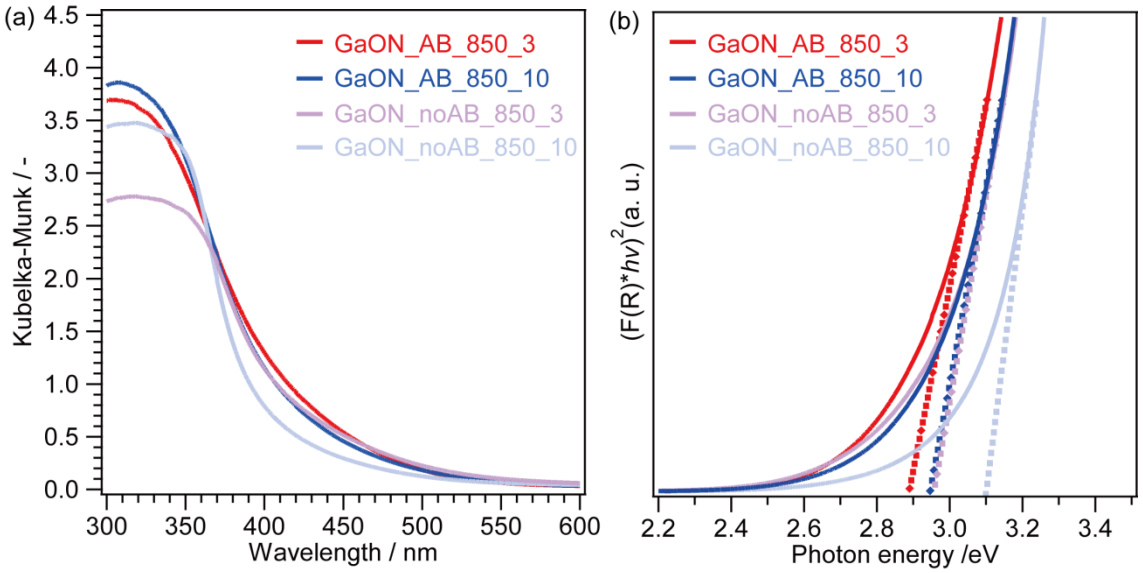

Fig. S10 (a) UV-vis DRS spectra and (b) Tauc plots of GaON_AB_850_3, GaON_AB_850_10, GaON_noAB_850_3, and GaON_AB_no850_10.