Electronic Supplementary Information for

Quantum Size Effect and Catalytic Activity of Nanosized Single-Crystalline Spherical β-Ga2O3 Particles by Thermal Annealing of Liquid Metal Nanoparticles

Shinya Sudo,^a Kenta Kokado,^{*a,b} Kazuki Sada^{*a,b}

^aGraduate School of Chemical Sciences and Engineering, Hokkaido University, Kita 10 Nishi 8, Kita-ku, Sapporo, Hokkaido 060-0810, Japan

^bFaculty of Science, Hokkaido University, Kita 10 Nishi 8, Kita-ku, Sapporo, Hokkaido 060-0810, Japan

Tel&Fax: (+81)11-706-3474

*E-mail: kokado@sci.hokudai.ac.jp, sadatcm@mail.sci.hokudai.ac.jp

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Figure S1. Histogram and average diameter of (a) **GaNP@DAm** and (a) **GONP** determined from TEM images.



Figure S2. Anticipated band gap depending on the particle diameter (*R*) of β-Ga₂O₃ nanoparticle from Brus equation shown inset, where *h* is Planck constant (4.136×10⁻¹⁵ eV·s), *e* is elementary charge (1.602×10⁻¹⁹ C), ε_0 is permittivity of vacuum (8.854×10⁻¹² F·m⁻¹), ε_r is dielectric constant of β-Ga₂O₃ (10.2), m_e^* is effective mass of electron (0.12×10⁻³¹ kg), m_h^* is effective mass of hole (0.24). The dashed lines were drawn from the observed E_g for **GONP** (4.84 eV) and **GO@SiO₂ NP** (4.89 eV), and the calculated diameter was 9.8 nm and 7.1 nm, respectively.



Figure S3. Histogram and average diameter of (a) **Ga@SiO₂ NP** and (a) **GO@SiO₂ NP** determined from TEM images.



Figure S4. (a) The absorption, excitation ($\lambda_{em} = 446 \text{ nm}$) and emission spectra ($\lambda_{ex} = 240 \text{ nm}$) and (b) band gap data of **GO@SiO₂ NP** obtained from UV reflectance.