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Perovskite-Sensitized β-Ga_2O_3 Nanorod Arrays for Highly Selective and Sensitive NO_2 Detection at High Temperature

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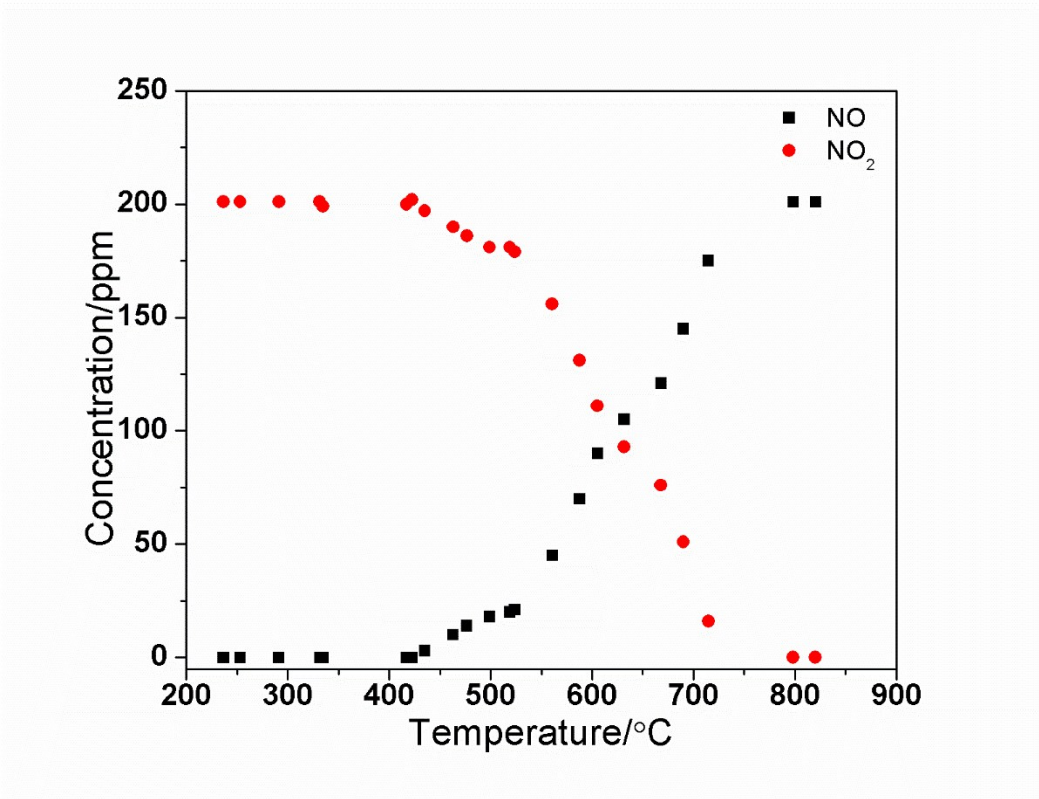

Figure S1. The variation of NO and NO_2 concentration versus temperature based on FTIR spectra. Initial gas parameter is 200 ppm NO_2 and N_2 as the balance gas while red dots represent the NO_2 and the black dots curve represent the NO.

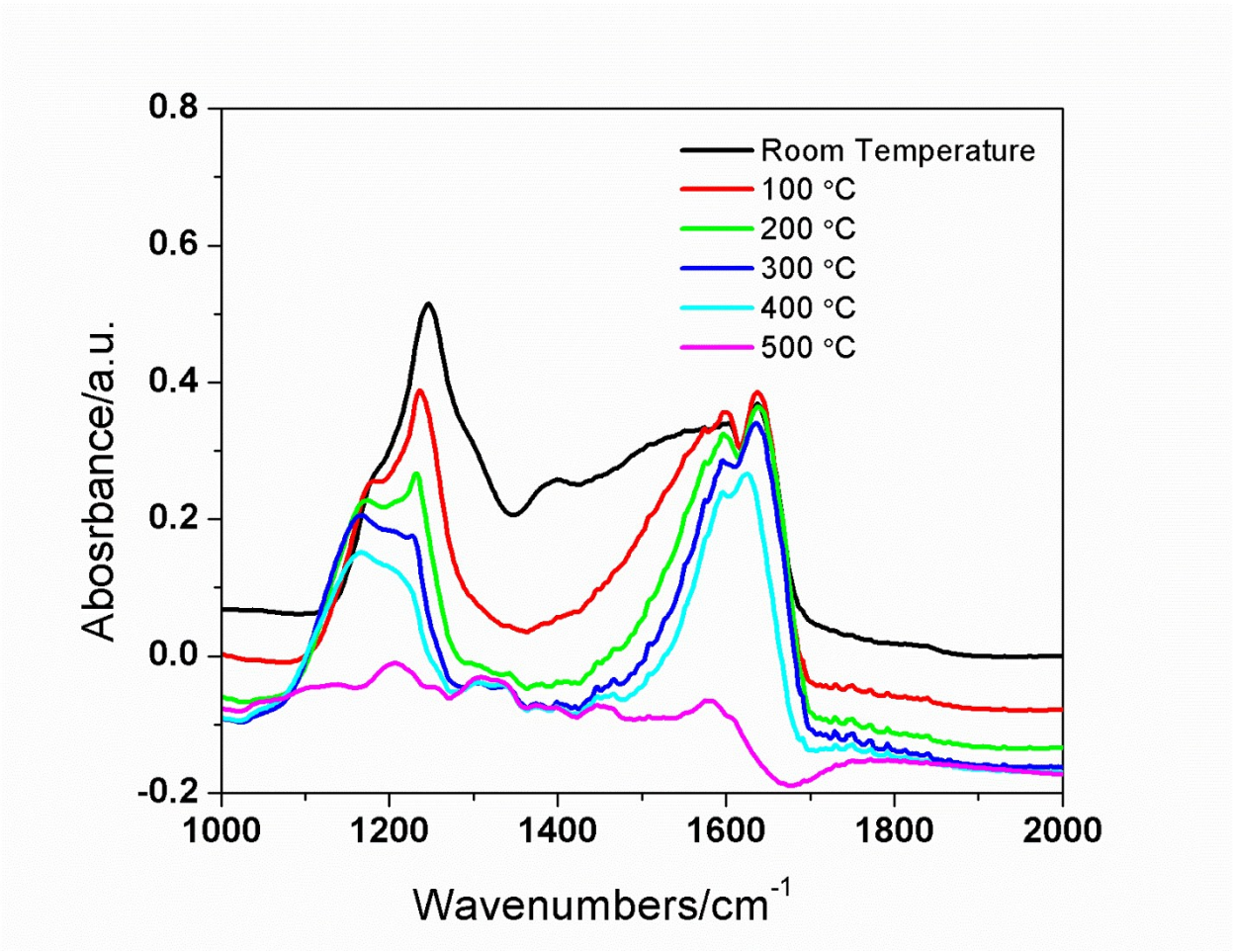

Figure S2. DRIFT spectra of 500 ppm NO and 1000 ppm O_2 co-adsorption on Ga_2O_3 versus temperature ranging from room temperature to 500 ℃.

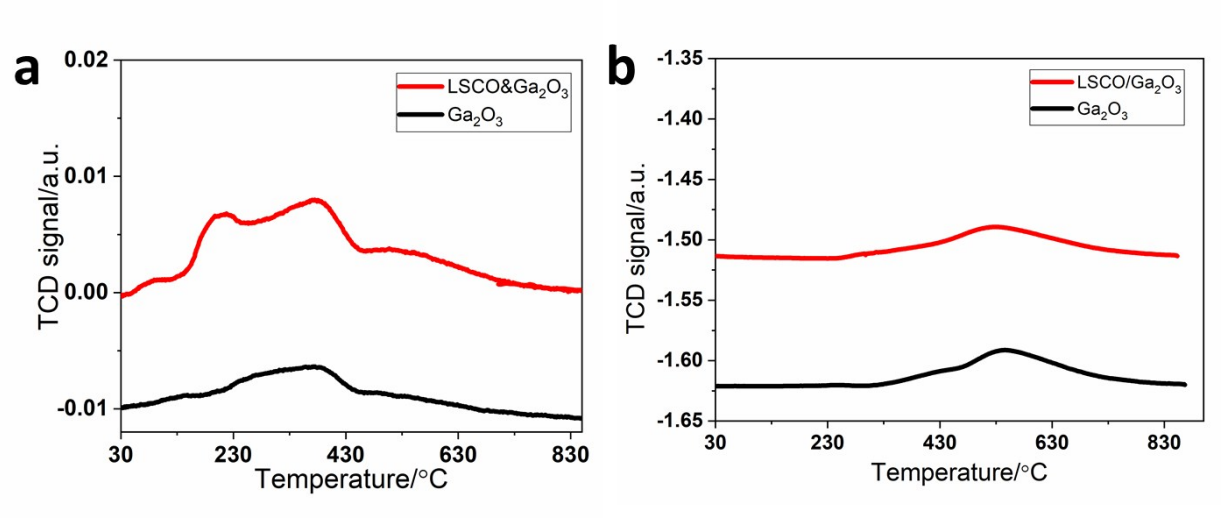

Figure S3. Temperature-programmed desorption (TPD) spectra collected from room-temperature NO_2-saturated LSCO/Ga_2O_3 and Ga_2O_3 (heating rate: 10 °C/min), where spectra of LSCO/Ga_2O_3 is labeled with red curve and pristine Ga_2O_3 is labeled with black curve.

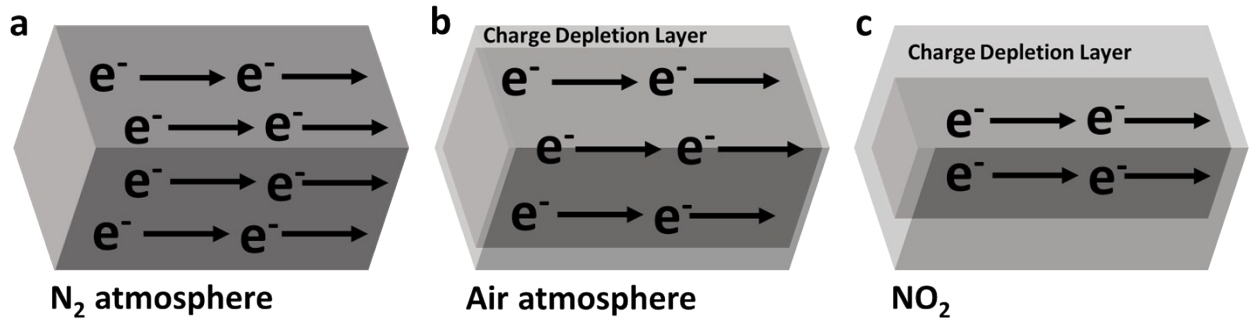

Figure S4. Schematic diagrams illustrating the formation of charge depletion layer in: (a) N_2 atmosphere, (b) Air atmosphere, and (c) NO_2 atmosphere.

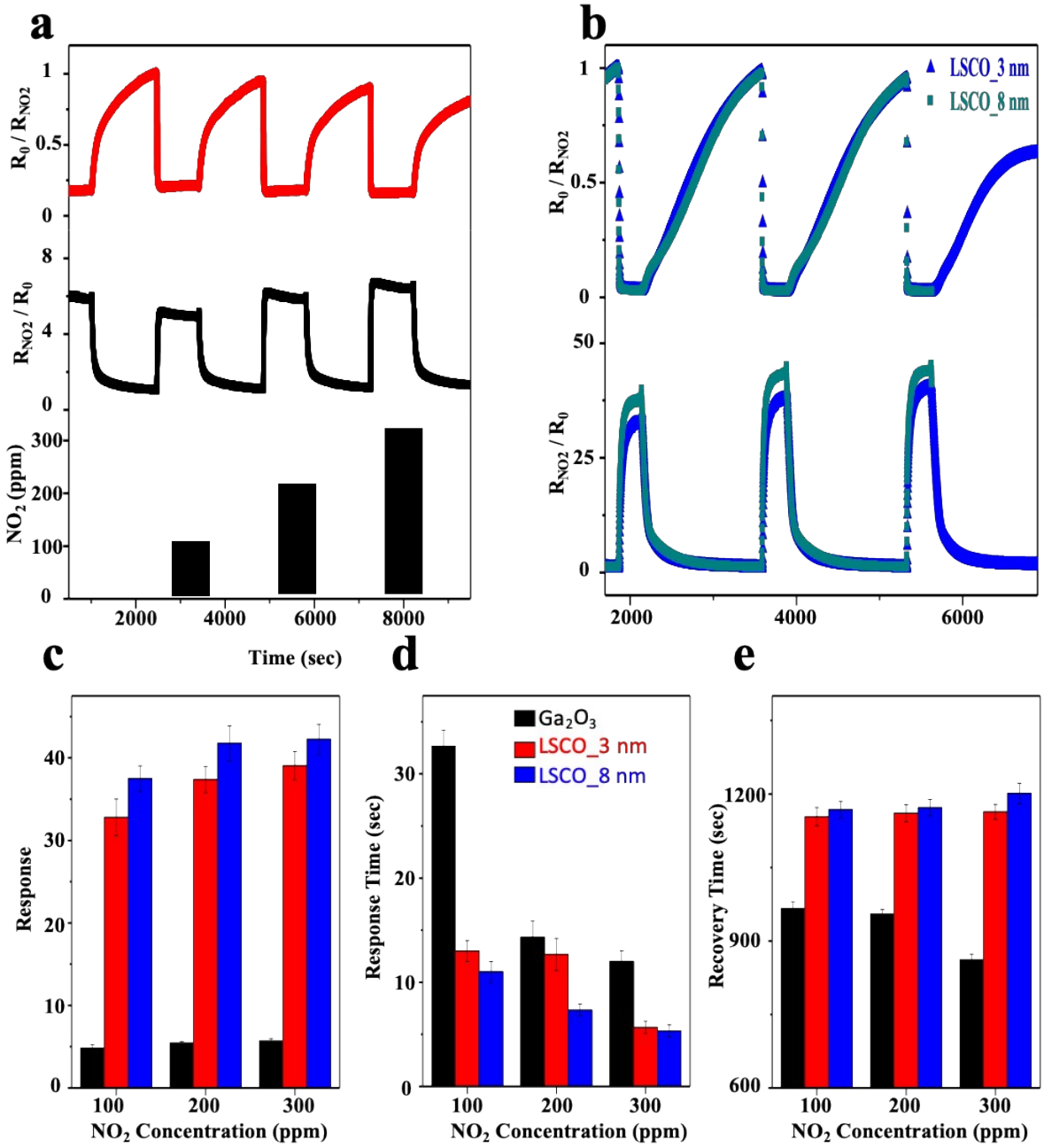

Figure S5. NO_2 gas sensing test results: (a) Normalized sensitivity-time characteristics of pure Ga_2O_3 nanorod array tested at 800 °C with N_2 as background atmosphere and its corresponding NO_2 concentration; (b) Normalized sensitivity-time characteristics of Ga_2O_3/LSCO nanorod arrays tested at 800 °C; (c) Response, (d) Response time and (e) Recovery time versus NO_2 concentrations characteristics of β-Ga_2O_3 and β-Ga_2O_3/LSCO nanorod arrays tested at 800 °C.

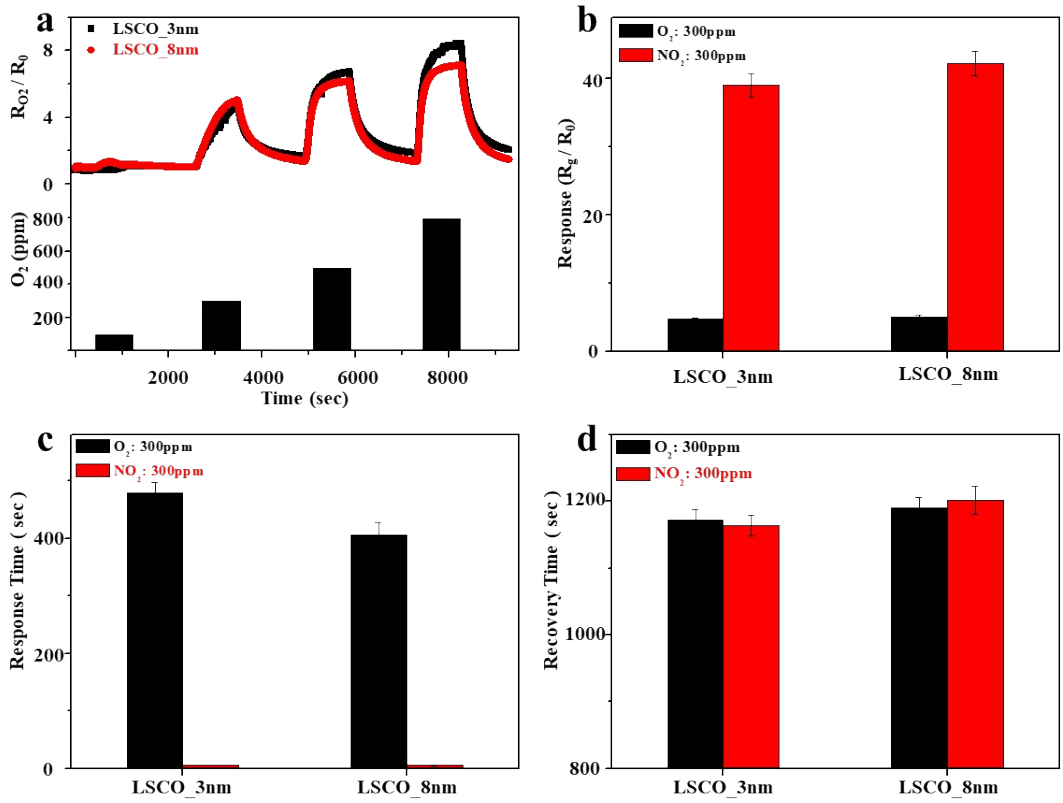

Figure S6. NO_2 gas sensing performance of LSCO/β-Ga_2O_3 nanorod (a) Normalized sensitivity-time oxygen sensing properties of LSCO/β-Ga_2O_3 nanorod arrays tested at 800 °C with N_2 as background atmosphere and its corresponding O_2 concentration. (b) Sensitivity (c) Response time and (d) Recovery time of LSCO/β-Ga_2O_3/ nanorod array upon exposure to 300 ppm of NO_2 and O_2 tested at 800 °C.