



Supplementary

Effect of Heterointerface on NO₂ Sensing Properties of In-Situ Formed TiO₂ QDs-Decorated NiO Nanosheets

Congyi Wu ^{1,2}, Jian Zhang ¹, Xiaoxia Wang ¹, Changsheng Xie ¹, Songxin Shi ^{2,*} and Dawen Zeng ^{1,3,*}

- ¹ State Key Laboratory of Material Processing and Die & Mould Technology, School of Materials Science and Engineering, Huazhong University of Science and Technology (HUST), Wuhan 430074, China; wucongyi@163.com (C.W.); jian.zhang1@anu.edu.au (J.Z.); wxjohn@163.com (X.W.); csxie@mail.hust.edu.cn (C.X.)
- ² State Key Lab of Digital Manufacturing Equipment and Technology, Huazhong University of Science and Technology (HUST), Wuhan 430074, China;
- ³ Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Hubei University, Wuhan 430062, China
- * Correspondence: shisx@mail.hust.edu.cn (S.S.); dwzeng@mail.hust.edu.cn (D.Z.)

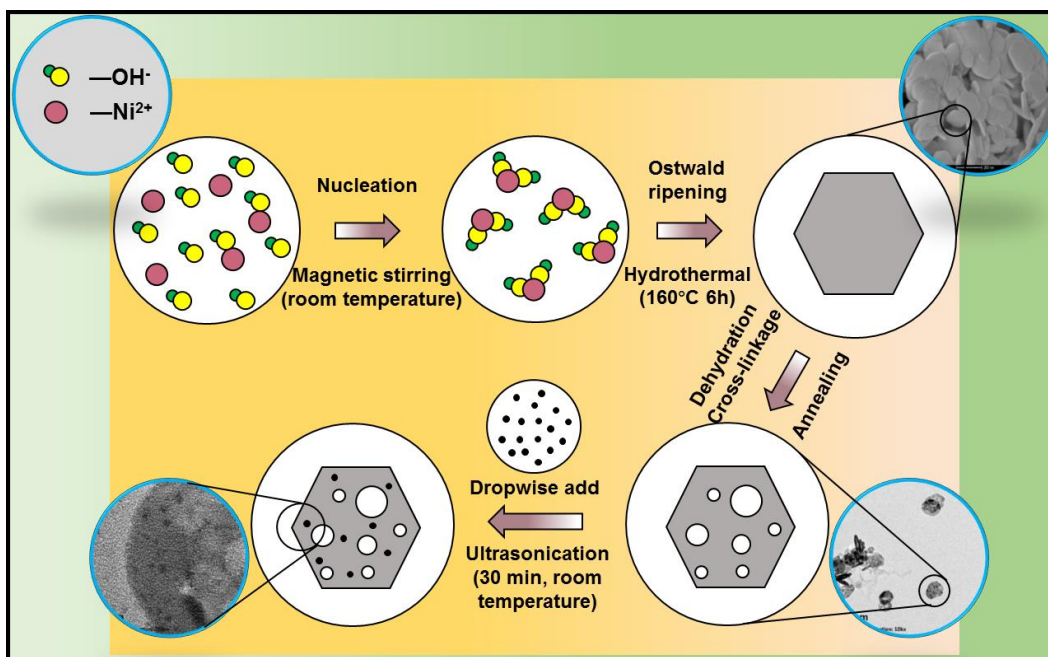


Figure S1. Schematic illustration of the synthesis procedure of the TiO₂-NiO nanocomposites.

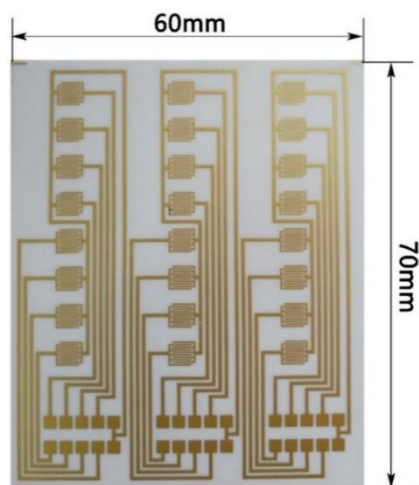


Figure S2. The schematic diagram of sensor substrate.

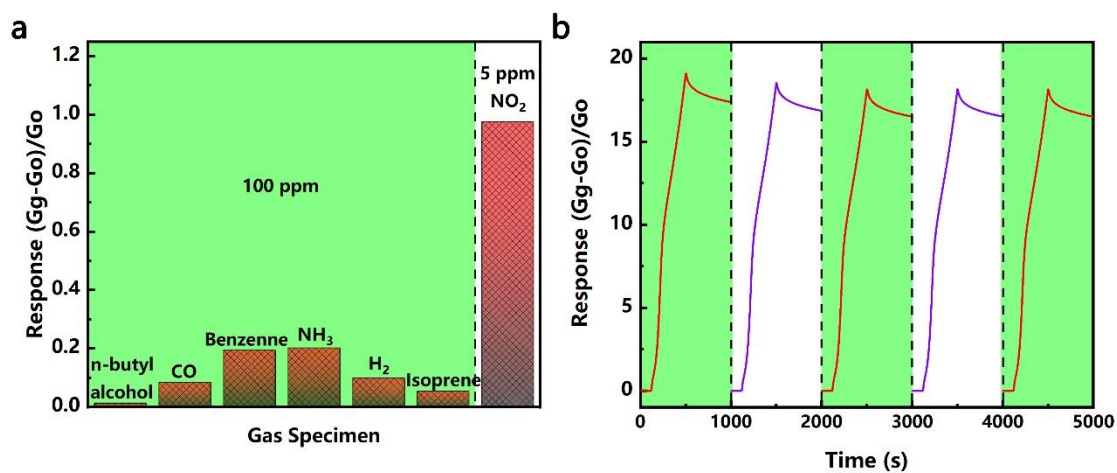


Figure S3. (a) The responses of the 5TiO₂QDs-NiO towards various gases (5 ppm for NO₂, 100 ppm for the rest). (b) The repeatability of the 5TiO₂QDs-NiO towards 60 ppm NO₂.

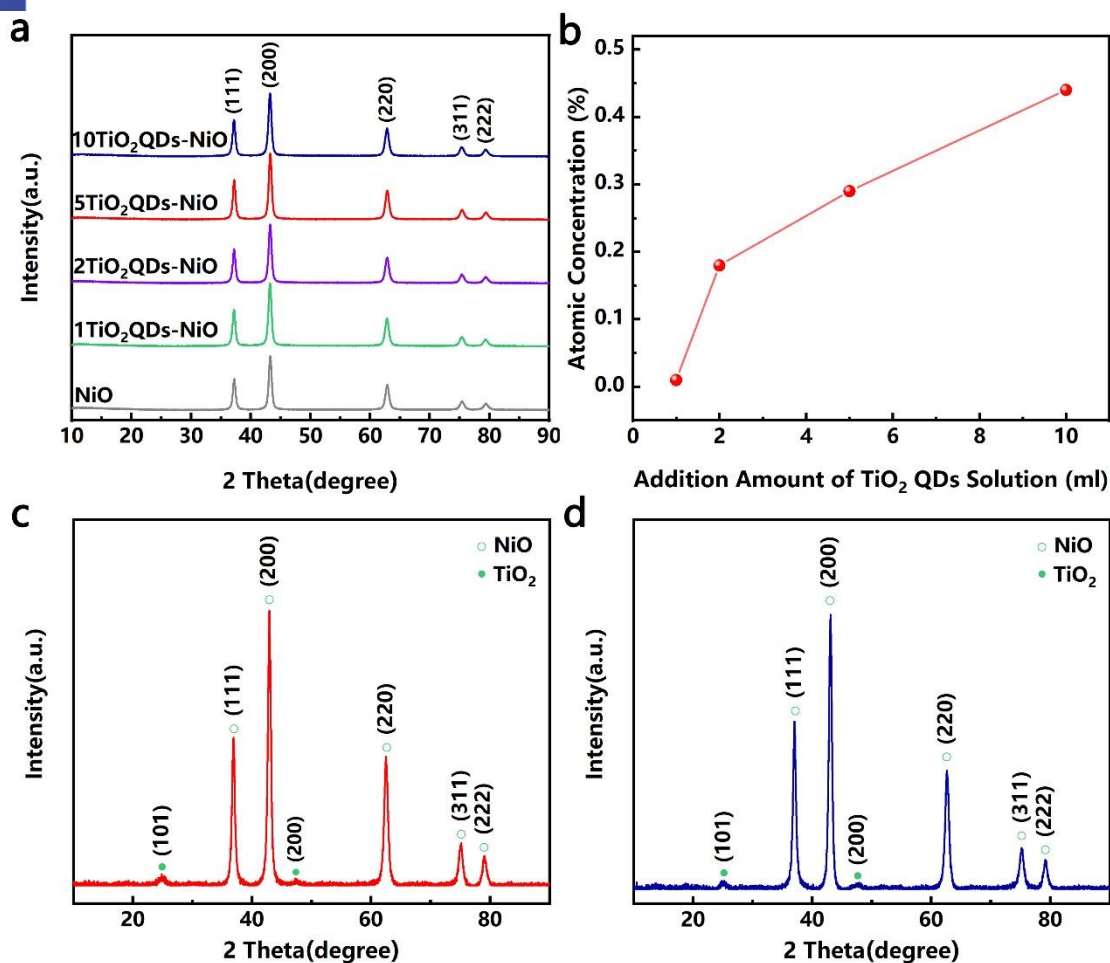


Figure S4. (a) XRD patterns of the NiO nanosheets and the TiO₂QDs-NiO nanohybrids; (b) Atomic concentration of Ti 2p of the TiO₂QDs-NiO nanohybrids; XRD patterns of (c) the 20TiO₂15-NiO and (d) the 50TiO₂30-NiO.

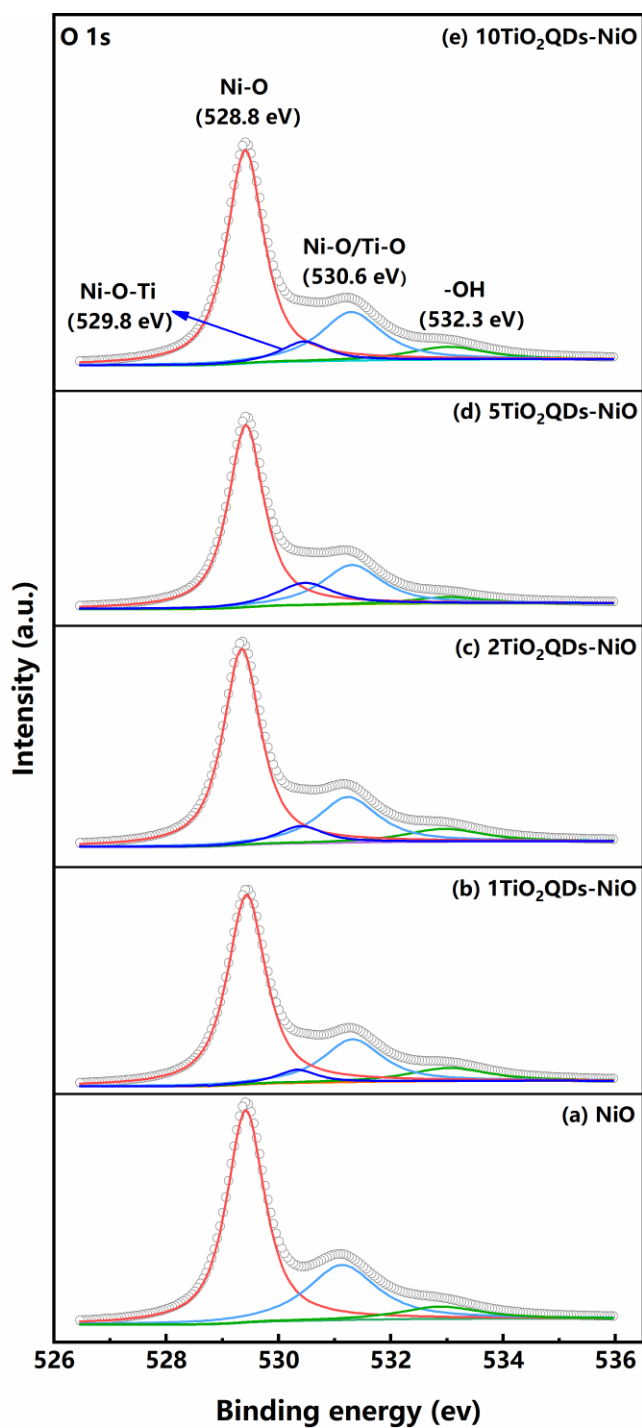


Figure S5. O 1s spectra of (a) the bare mesoporous NiO, (b) 1TiO₂QDs-NiO, (c) 2 TiO₂QDs-NiO, (d) 5 TiO₂QDs-NiO, (e) 10 TiO₂QDs-NiO from XPS.

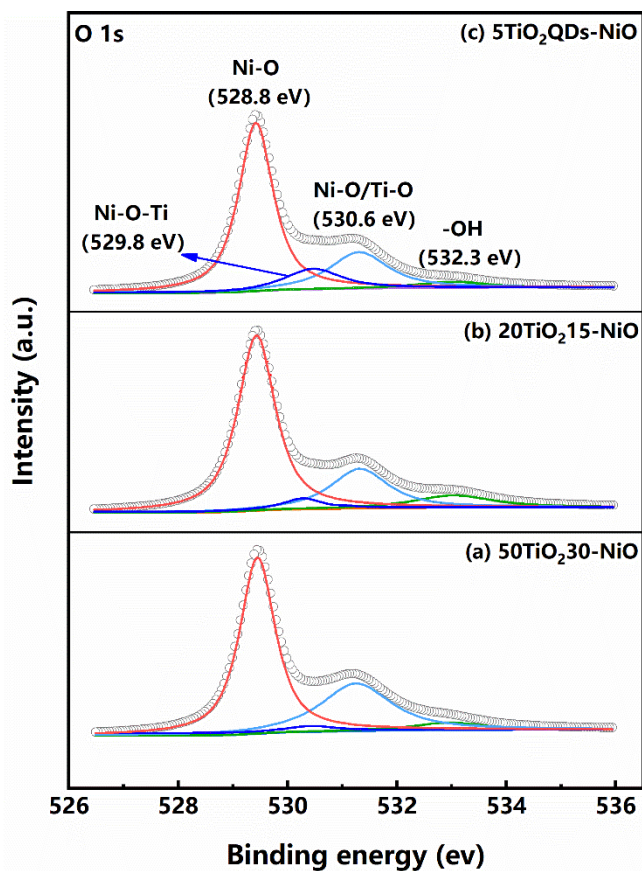


Figure S6. O 1s spectra of (a) 50TiO₂/30-NiO, (b) 20TiO₂/15-NiO, (c) 5 TiO₂QDs-NiO from XPS.

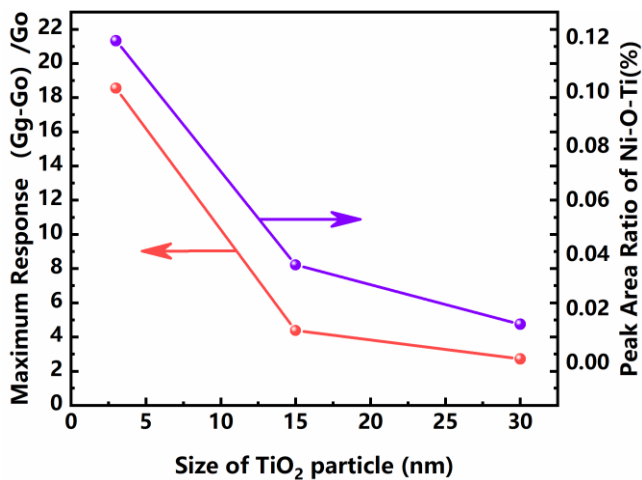


Figure S7. With the increase of TiO₂ nanoparticle size, comparison between the variation of the maximum responses to 60 ppm NO₂ and the variation of the peak area ratio of Ni-O-Ti.

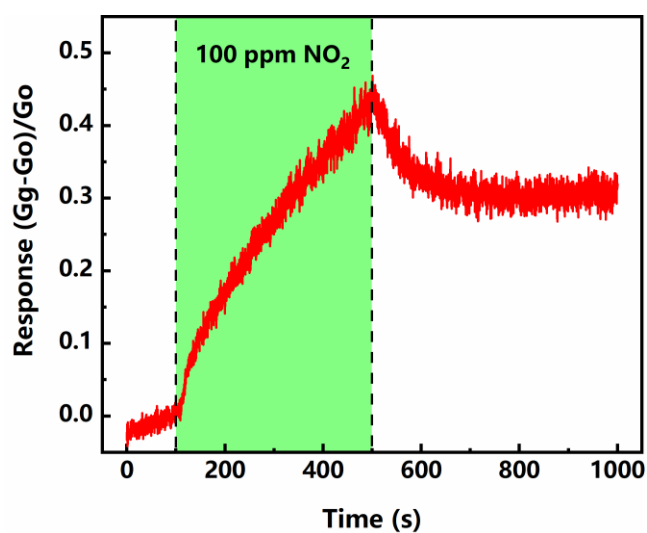


Figure S8. Dynamic sensitivity-recovery curves of TiO₂ QDs to 100ppm NO₂.

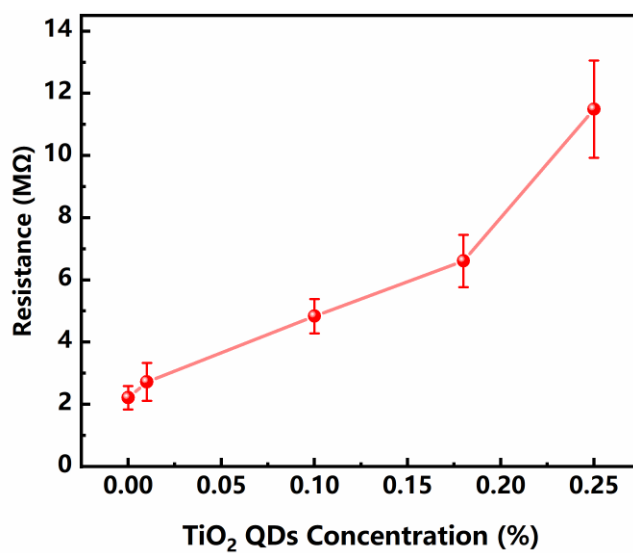


Figure S9. The Resistance of the nanohybrids with different addition quantity of TiO₂ QDs.