

ASSOCIATED CONTENT

Supporting Information.

Mid-infrared response of PbS colloidal quantum dot solids

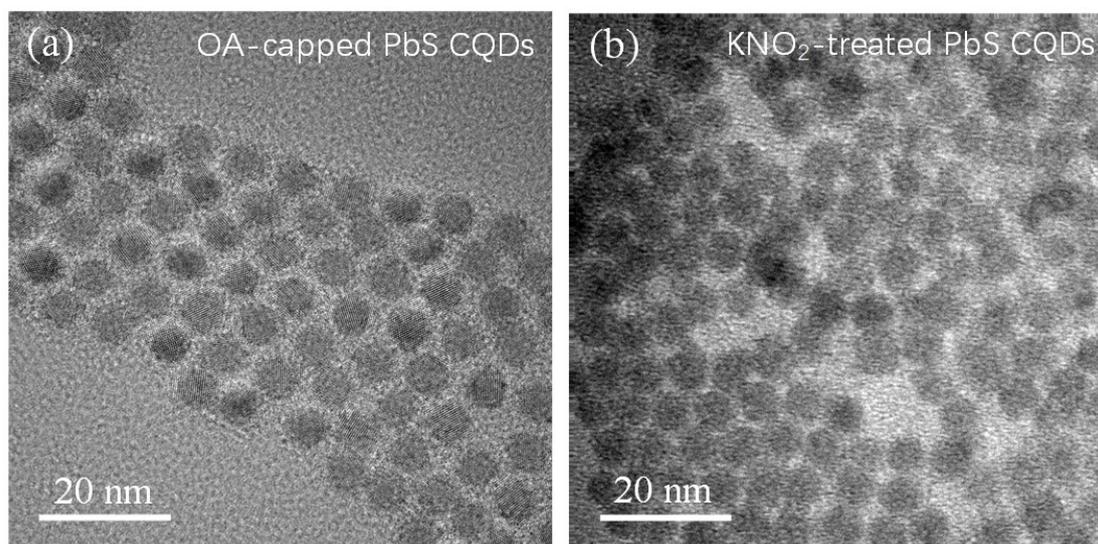
Jungang He,^{1,2,*} Xianchang Zhou,¹ Ya, Wang,² Mohan Yuan,¹ Hang, Xia,² Xiao Chen,¹ You Ge,¹ Xia Wang,¹ Liang Gao,^{2,*} Jiang Tang²

1 Hubei Key Laboratory of Plasma Chemistry and Advanced Materials, Hubei Engineering Technology Research Center of Optoelectronic and New Energy Materials, School of Materials Science and Engineering, Wuhan Institute of Technology, Wuhan 430205, P. R. China

2 Sargent Joint Research Center, Wuhan National Laboratory for Optoelectronics (WNLO), School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan 430074, Hubei, P. R. China

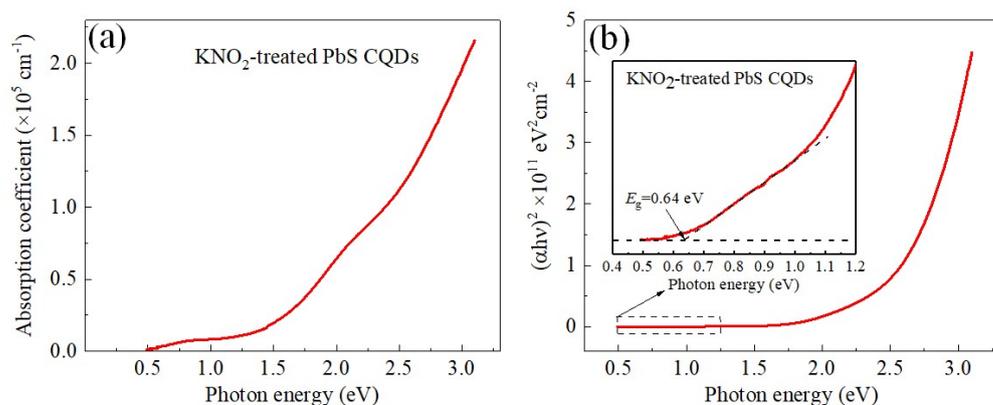
KEYWORDS: lead sulfide, colloidal quantum dot, extrinsic response, mid-infrared response

Figure S1



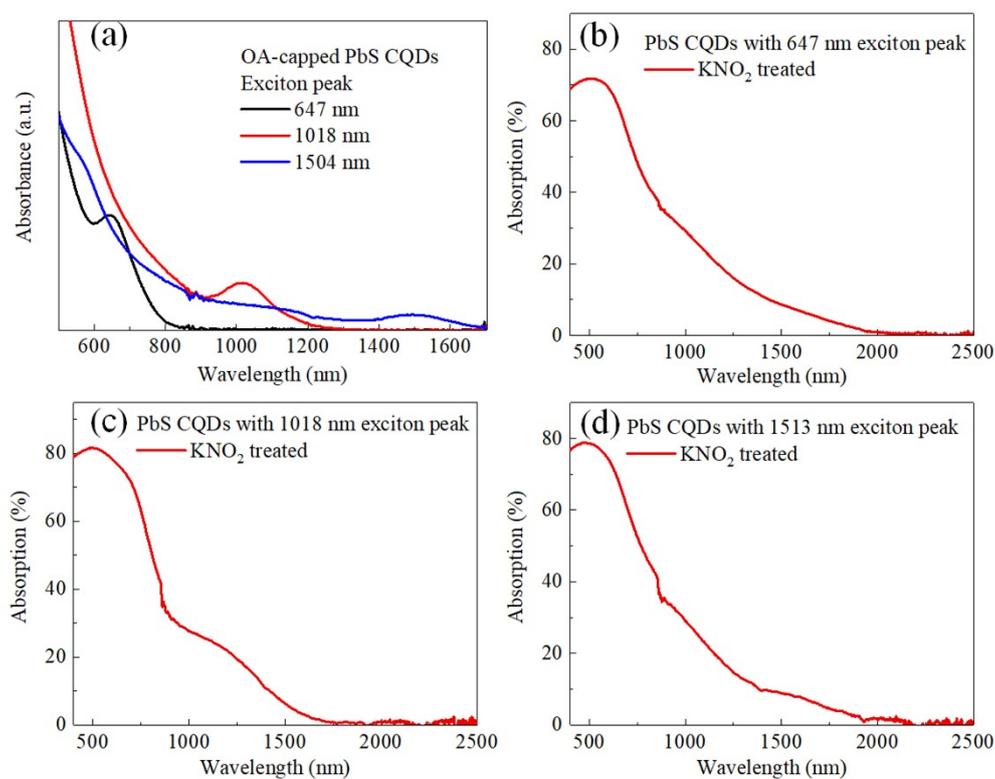
(a) TEM image of OA-capped PbS CQDs. (b) TEM image of KNO₂-treated PbS CQDs

Figure S2



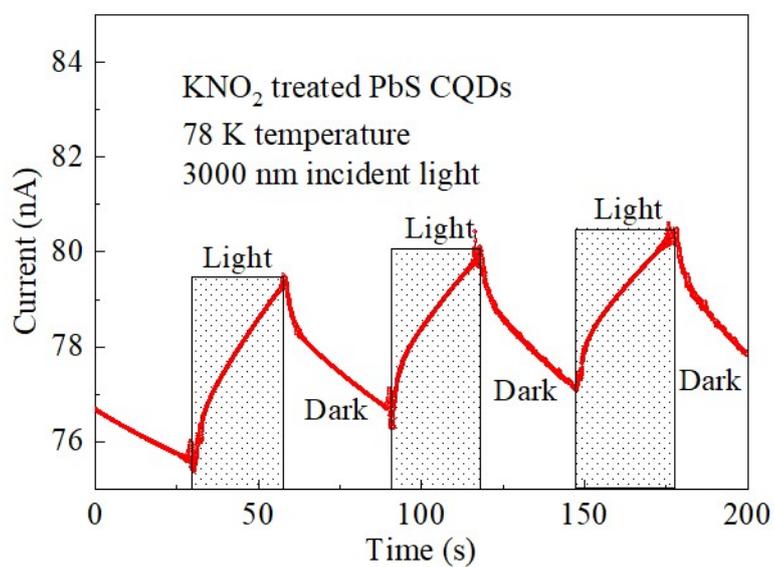
(a) Absorption coefficient spectrum of KNO_2 -treated PbS CQDs. (b) Tauc plots of KNO_2 -treated PbS CQDs. The inset is the Tauc plot of KNO_2 -treated PbS CQDs between 0.4 eV to 1.2 eV.

Figure S3



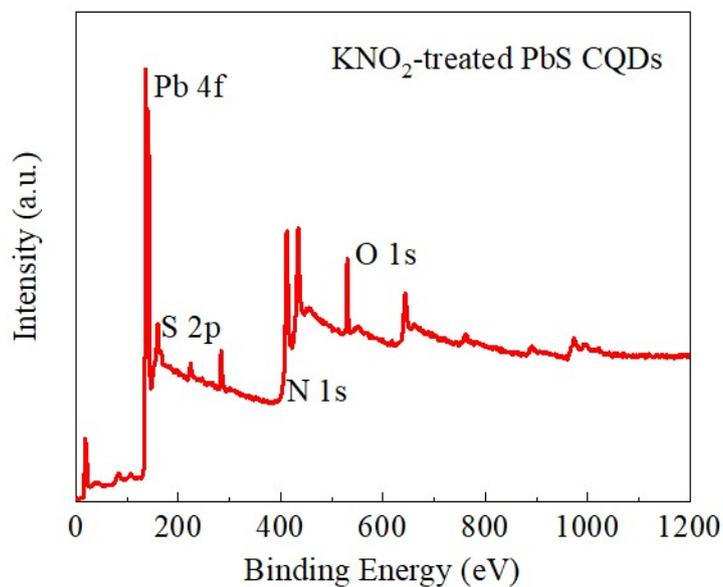
(a) OA-capped PbS CQDs with exciton peak of 647 nm, 1018 nm, and 1513 nm. (b) KNO_2 -treated PbS CQDs with exciton peak of 647 nm. (c) KNO_2 -treated PbS CQDs with exciton peak of 1018 nm. (d) KNO_2 -treated PbS CQDs with exciton peak of 1513 nm.

Figure S4



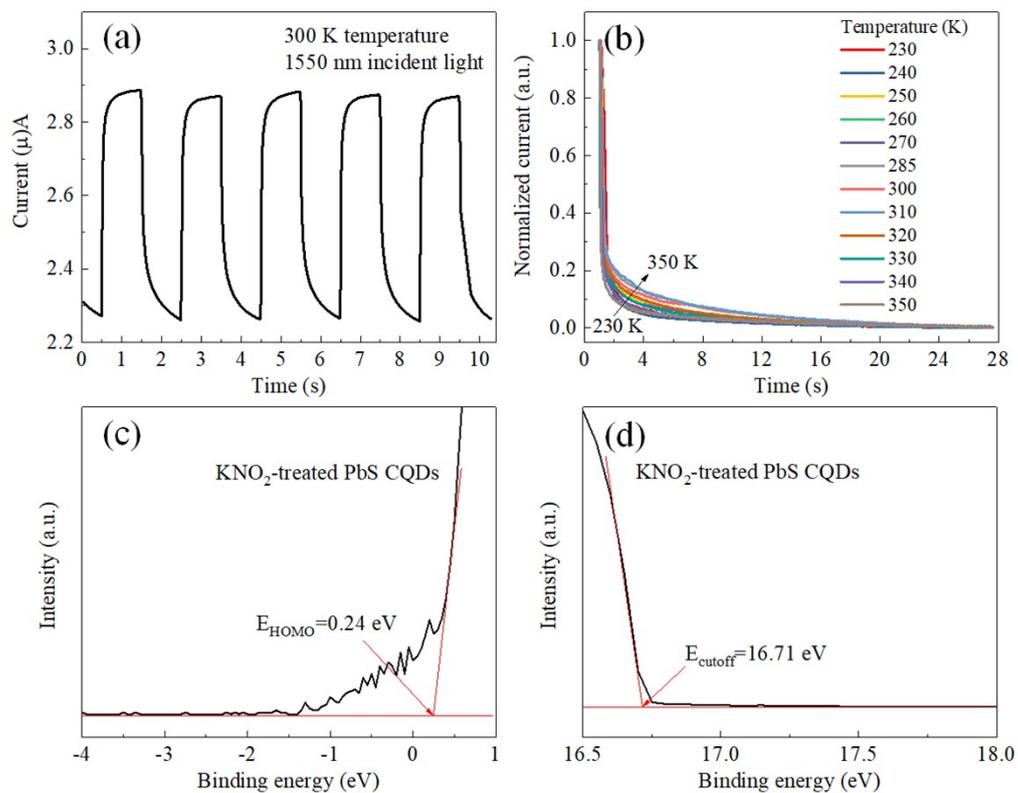
Periodic response of KNO₂-treated PbS CQD photoconductor under the illumination of 3000 nm incident light at 78 K temperature.

Figure S5



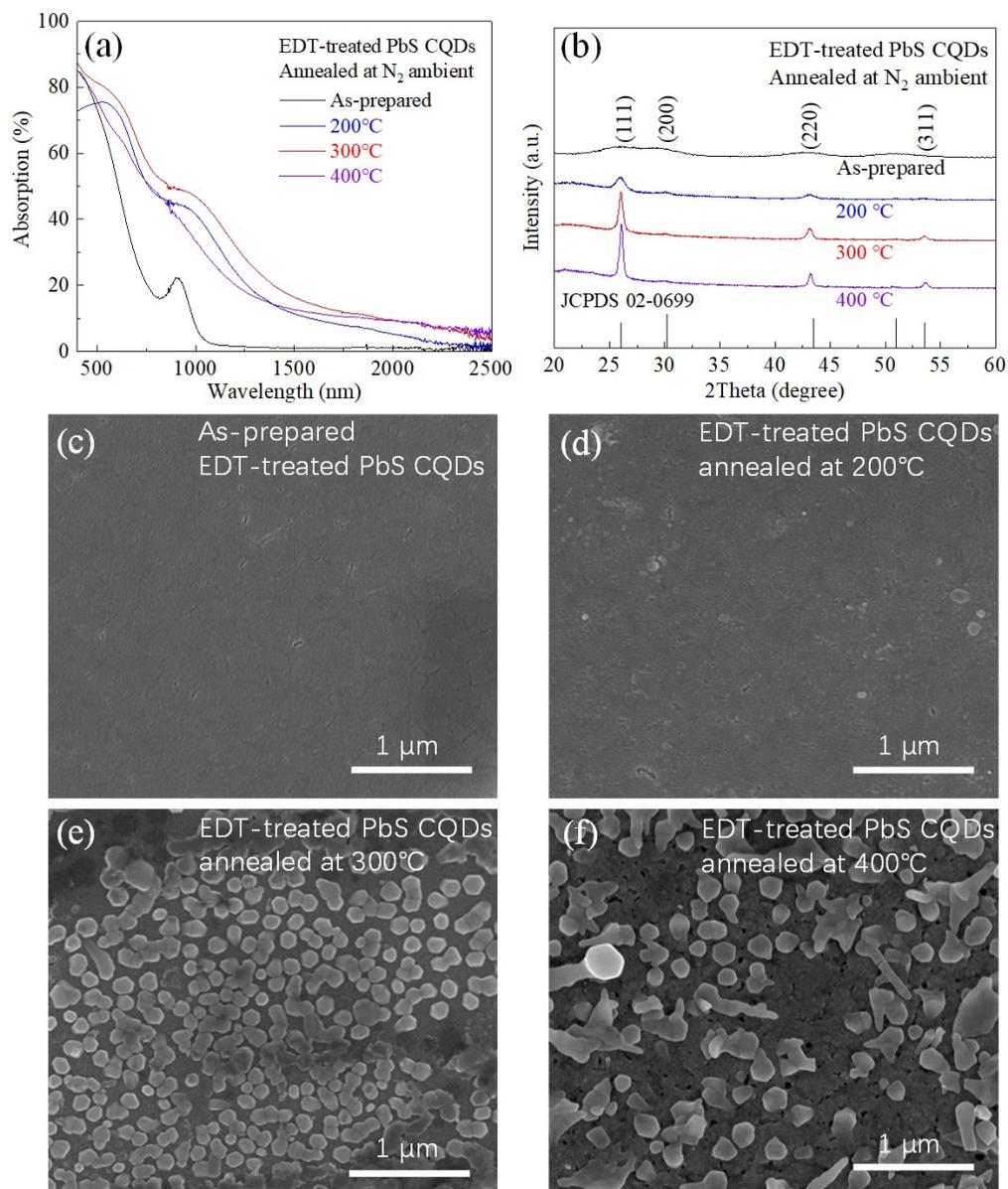
The Full XPS spectrum of KNO₂-treated PbS CQDs

Figure S6



(a) The response of KNO₂-treated PbS CQDs generated under the illumination of 1550 nm incident light at 300 K temperature. (b) The photocurrent decay of KNO₂-treated PbS CQDs generated under the illumination of 1550 nm incident light at different temperature. (c) The secondary electron cutoff region of KNO₂-treated PbS CQDs. (d) The Fermi edge of KNO₂-treated PbS CQDs.

Figure S7



(a) Absorption spectra of EDT-treated PbS CQDs annealed at different temperature. (b) XRD patterns of EDT-treated PbS CQDs annealed at different temperature. (c), (d), (e), and (f) Top-view SEM image of EDT-treated PbS CQDs annealed at different temperature.