Physical Chemistry Chemical Physics

Full Paper

Supporting Information for

Received 00th January 20xx,
Accepted 00th January 20xx

DOI: 10.1039/x0xx00000x

www.rsc.org/

Reaction mechanism of PbS-on-ZnO heterostructure and enhanced photovoltaic diodes performance with interface modulated heterojunction energy band structure

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Supporting information S1:

We investigated the influence of the SILAR deposition sequence on the light absorption properties of the PbS–ZnO heterostructure. The absorption of the films increases and extends into the visible region of the spectrum with an increasing number of SILAR cycles. Immersion time dependence light absorption spectra of Pb-S-ZnO and S-Pb-ZnO are shown in Figure S1. The light absorption increases with SILAR time, which can be attributed to the increasing thickness of PbS QDs layer. One important thing needed to be pointed out is that the light absorption increase more quickly for S-Pb-ZnO than Pb-S-ZnO. This is in good accordance with the dense distribution of PbS QDs on ZnO.

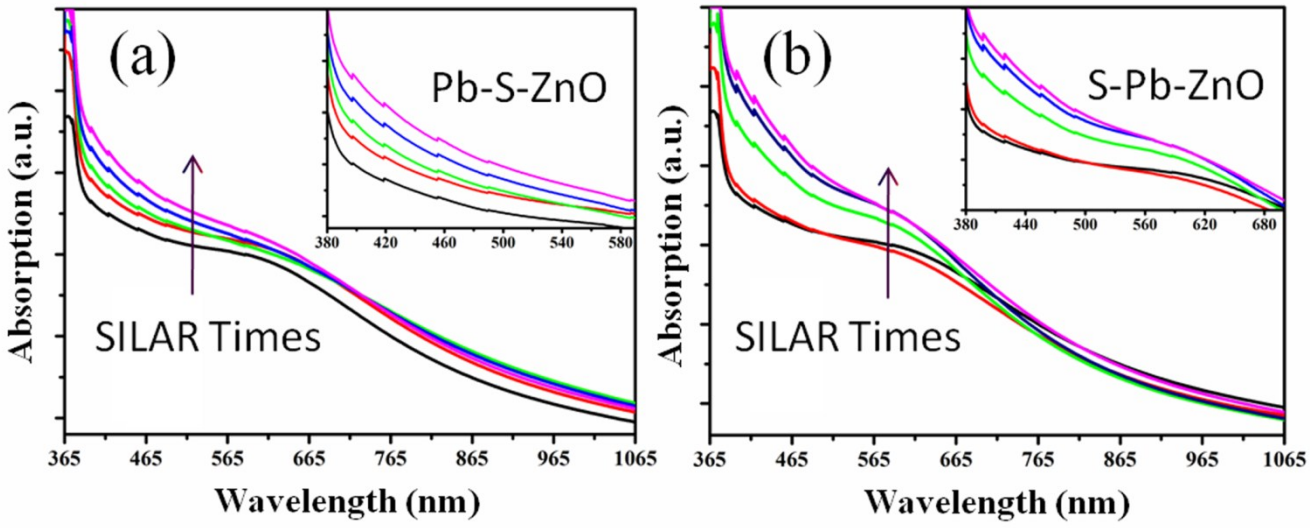

Figure S1. Immersion time dependence light absorption spectra of Pb-S-ZnO and S-Pb-ZnO.

Supporting information S2:

Figure S2 is band structure diagrams of Pb-S-ZnO at different bias voltages under green light illumination. At positive voltage, the diffusion of carriers' is prompted and majority carrier transportation domains the current variations. When the negative voltage is applied, the current mainly dependent on minority transportation. Owing to the small amount of minority carriers, the

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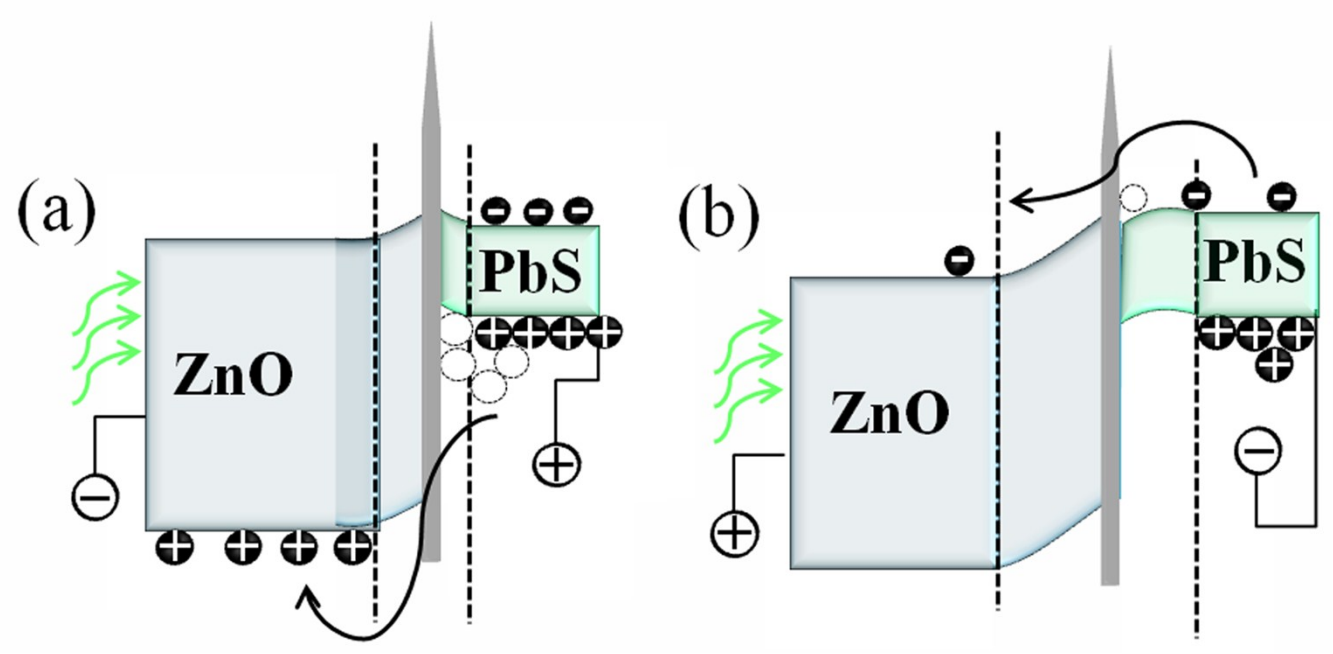
current shows nearly constant values with the increasing voltage. The variation of current curve at positive voltage is believed to be caused by the formation of insulating PbO layer, which leads to the formation of inversion layer.



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