Electronic Supplementary Material (ESI) for Nanoscale.
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Uncover the density of nanowire surface trap states hidden in the transient photoconductance

(Supporting Information)

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The supporting information contains 14 figures in total and one equation Eq. S1.

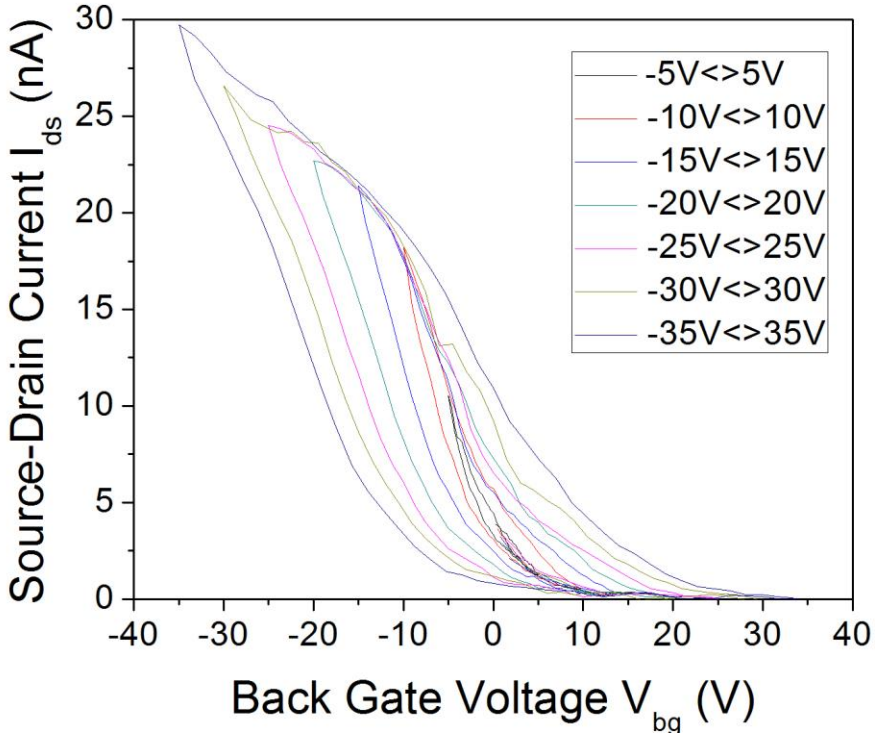

Figure S1. Hysteresis loop in the I_{ds}-V_{bg} when the back gate voltage increases the sweep range from (-5V, 5V) to (-35V, 35V)

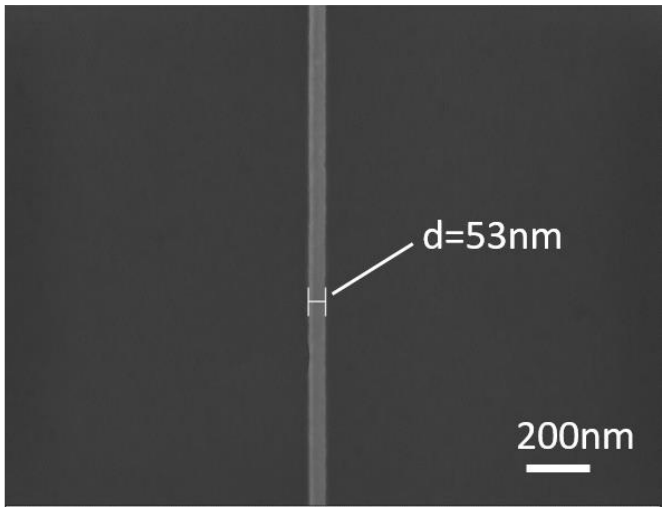

Figure S2. SEM image, showing that the diameter of the SiNW is 53nm. The scale bar is 200nm.

Equation S1

From Fig. 2(c) we can see that the conductance is 0.37 μS in dark. Using the following expression:

$$\sigma = ep\mu_p \frac{A_C}{l} \qquad \textit{Eq.(S1)}$$

where σ , e, μ_p, A_c and L are the conductance in dark, charge unit, hole mobility, nanowire cross-section area and length, respectively. From Eq.(S1), we can find the carrier concentration of $\sim 2.48\times10^{18}$ cm^{-3}.

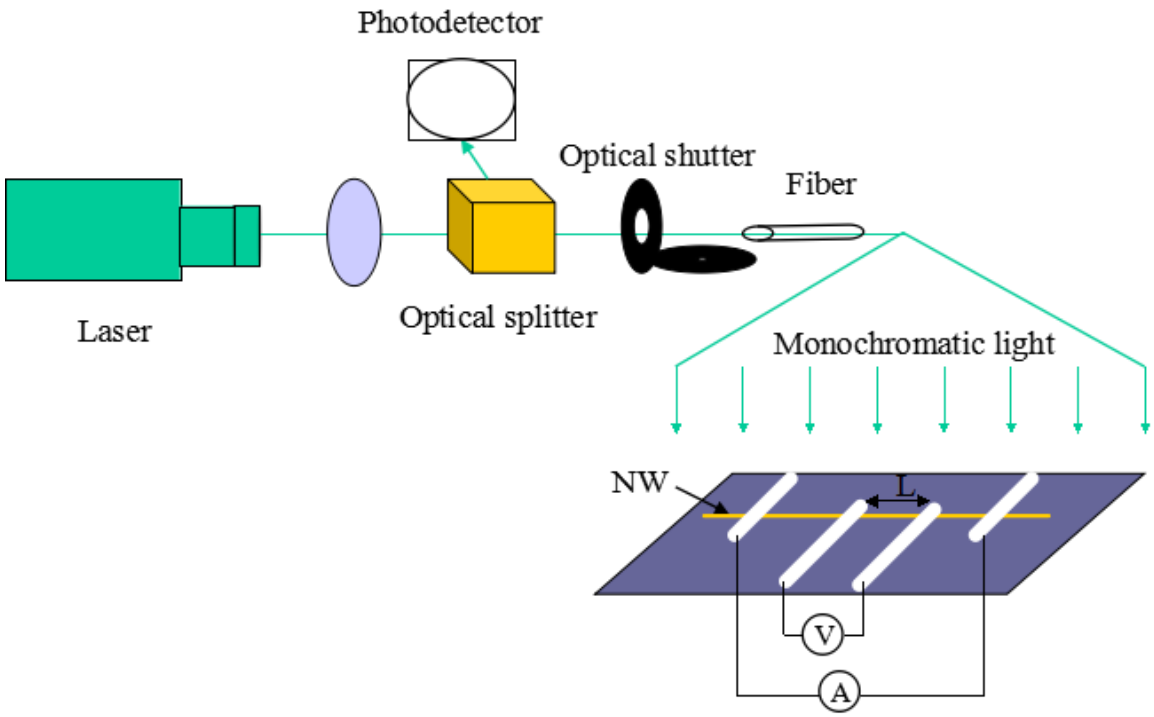

Figure S3. Diagram of the experimental setup. 50% of the light is deflected to the photodetector which is used to monitor the light intensity. The light intensity illuminated on the nanowire is difficult to quantify. The light intensity we identify in the article is our best estimate and only accurate in relative term. But it does not affect our conclusion.

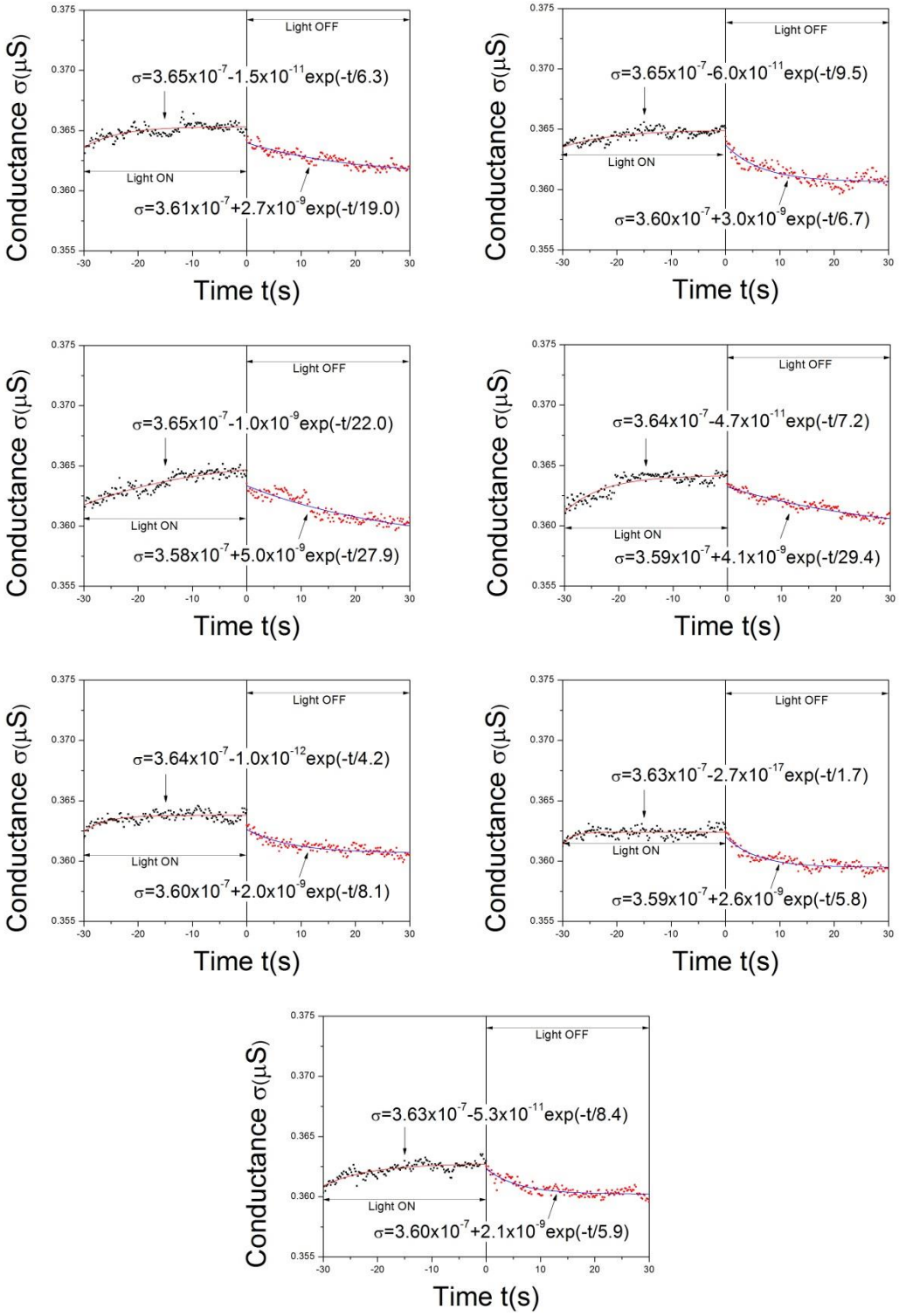

Figure S4. Experimental data fitting under light illumination intensity of 0.3W/cm^2

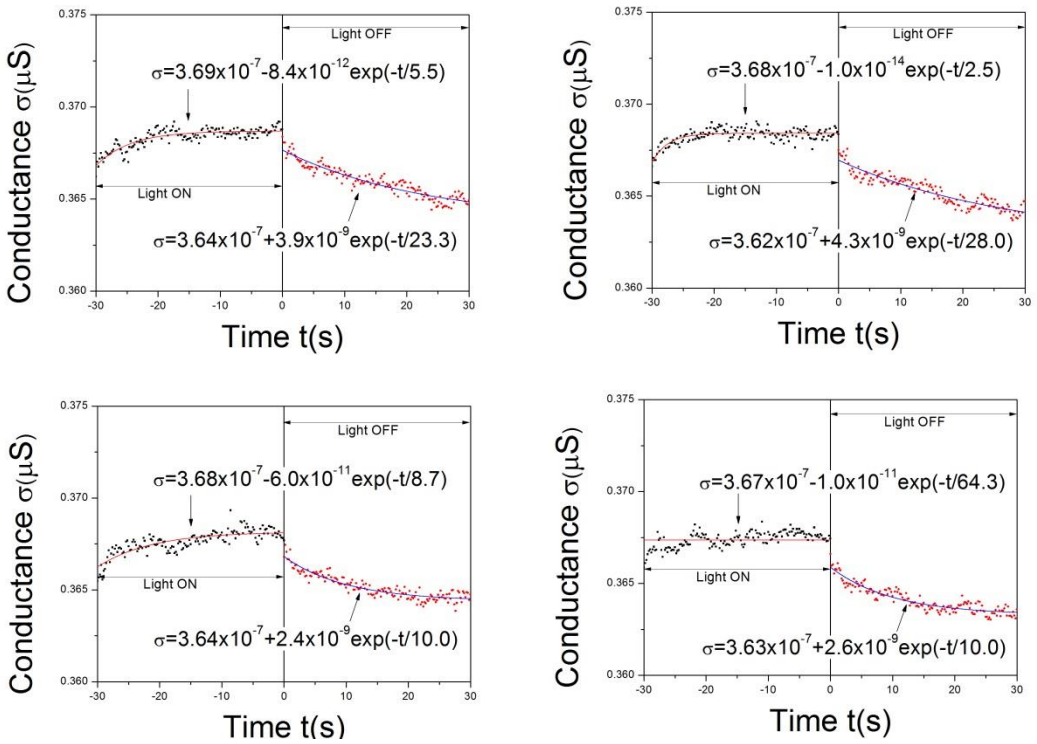

Figure S5. Experimental data fitting under light illumination intensity of 0.5W/cm^2

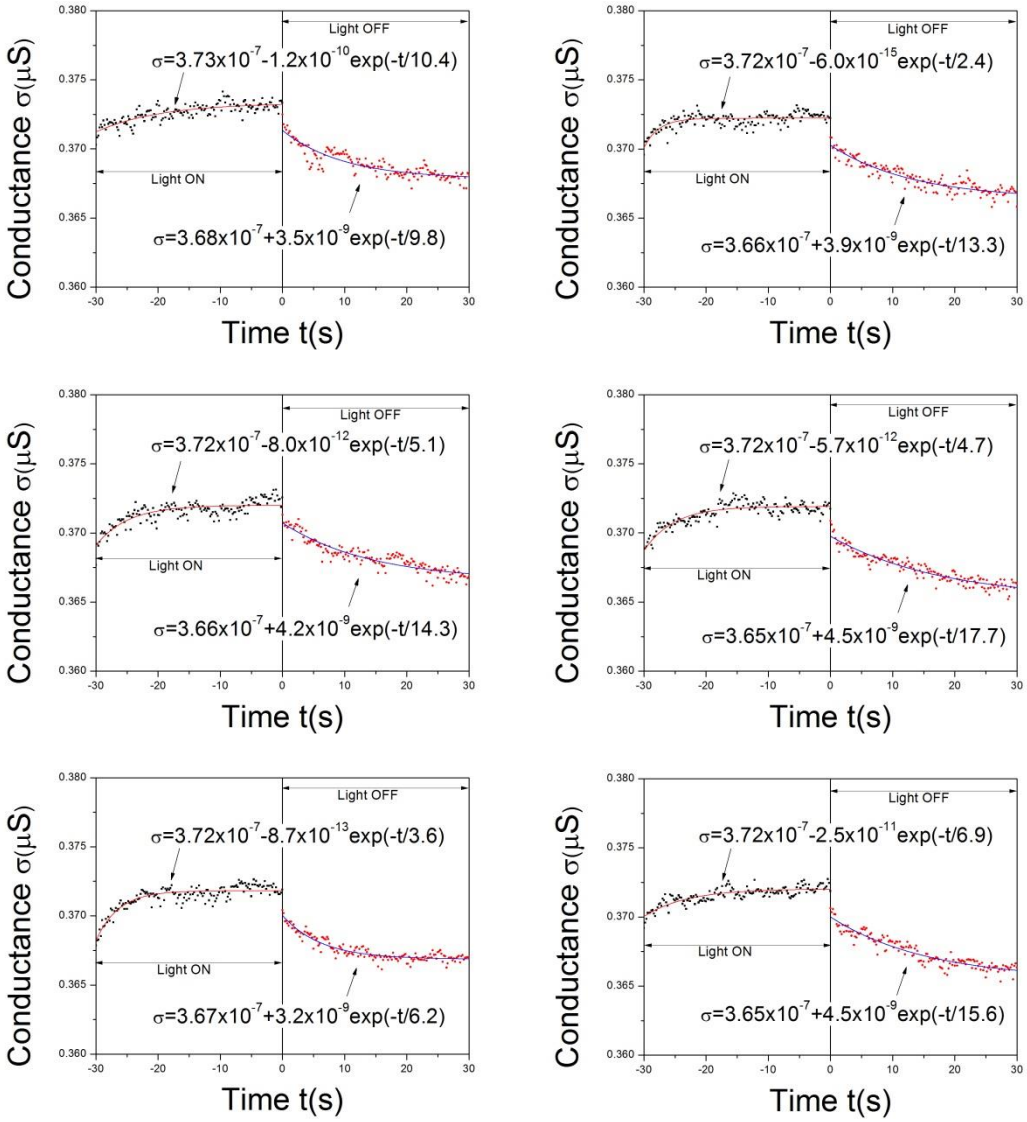

Figure S6. Experimental data fitting under light illumination intensity of 1W/cm^2

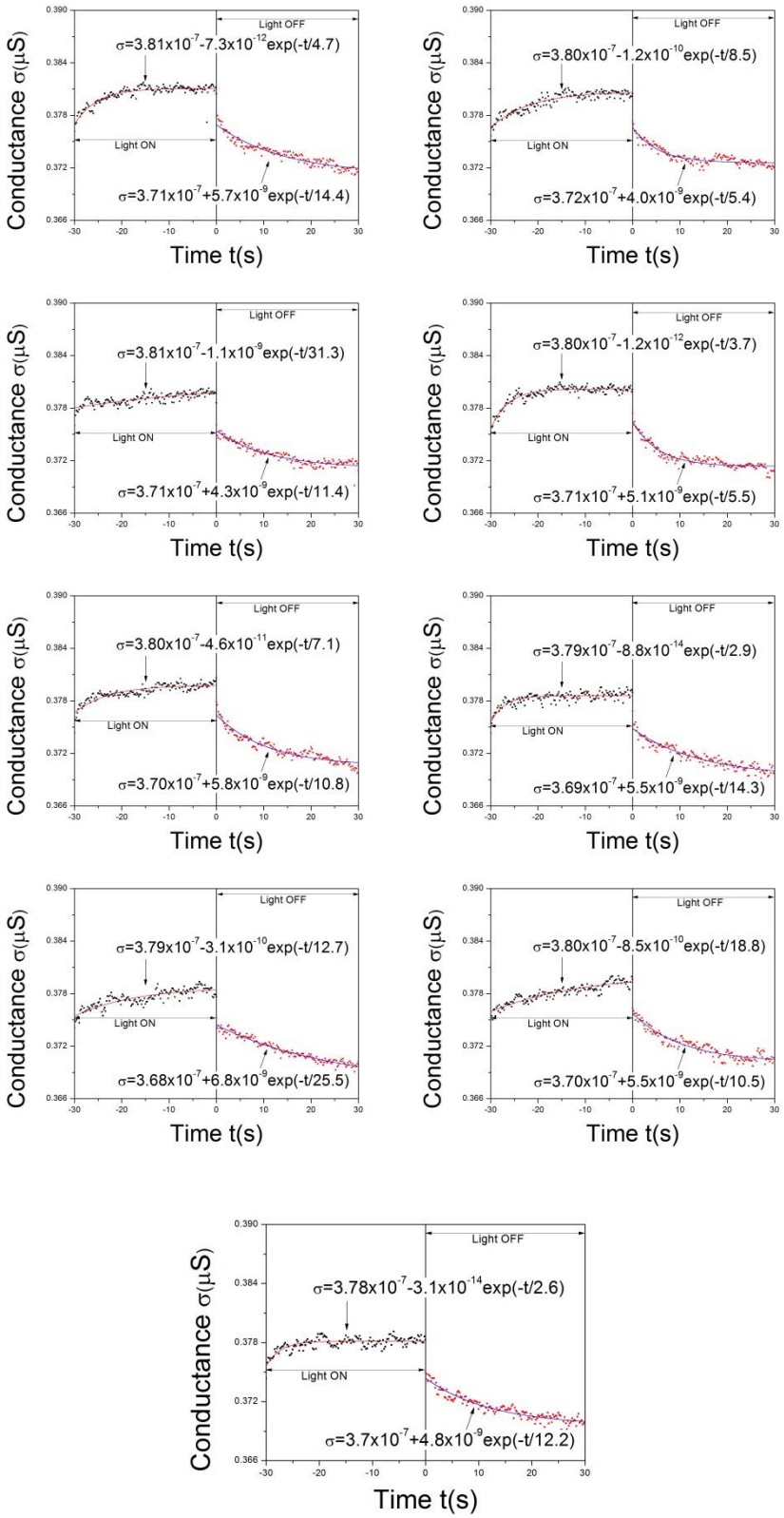

Figure S7. Experimental data fitting under light illumination intensity of 3W/cm^2

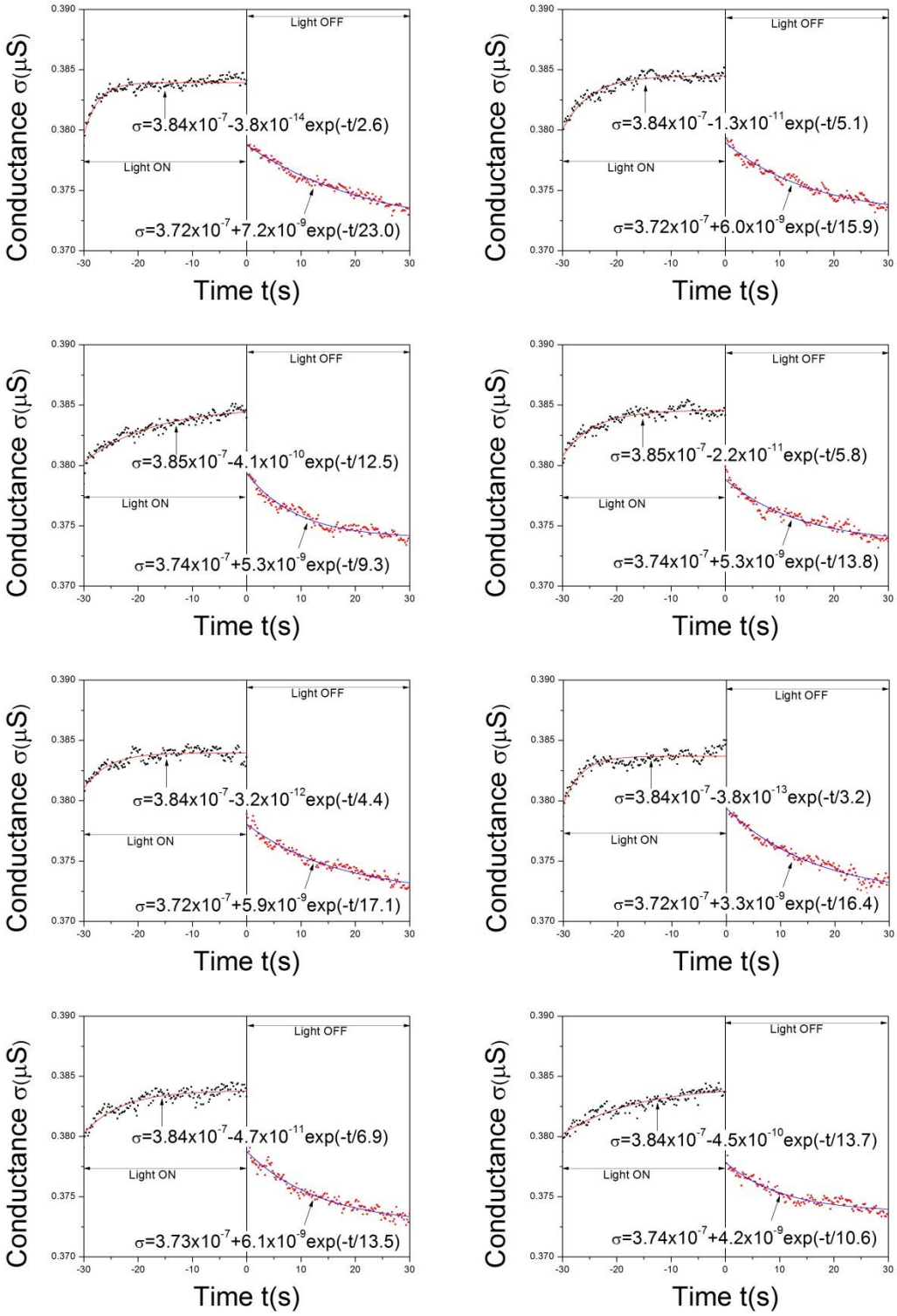

Figure S8. Experimental data fitting under light illumination intensity of 5W/cm^2

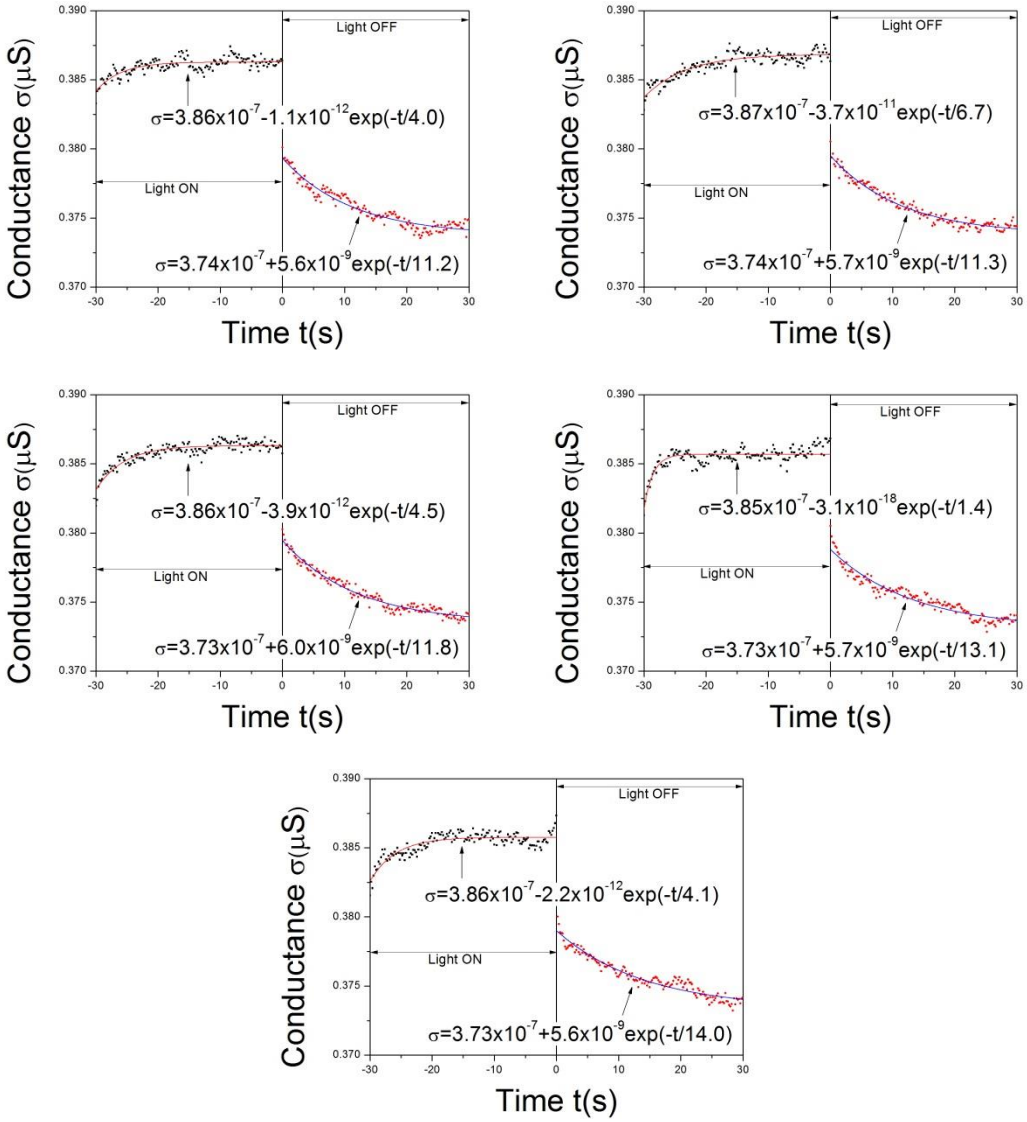

Figure S9. Experimental data fitting under light illumination intensity of 8W/cm^2

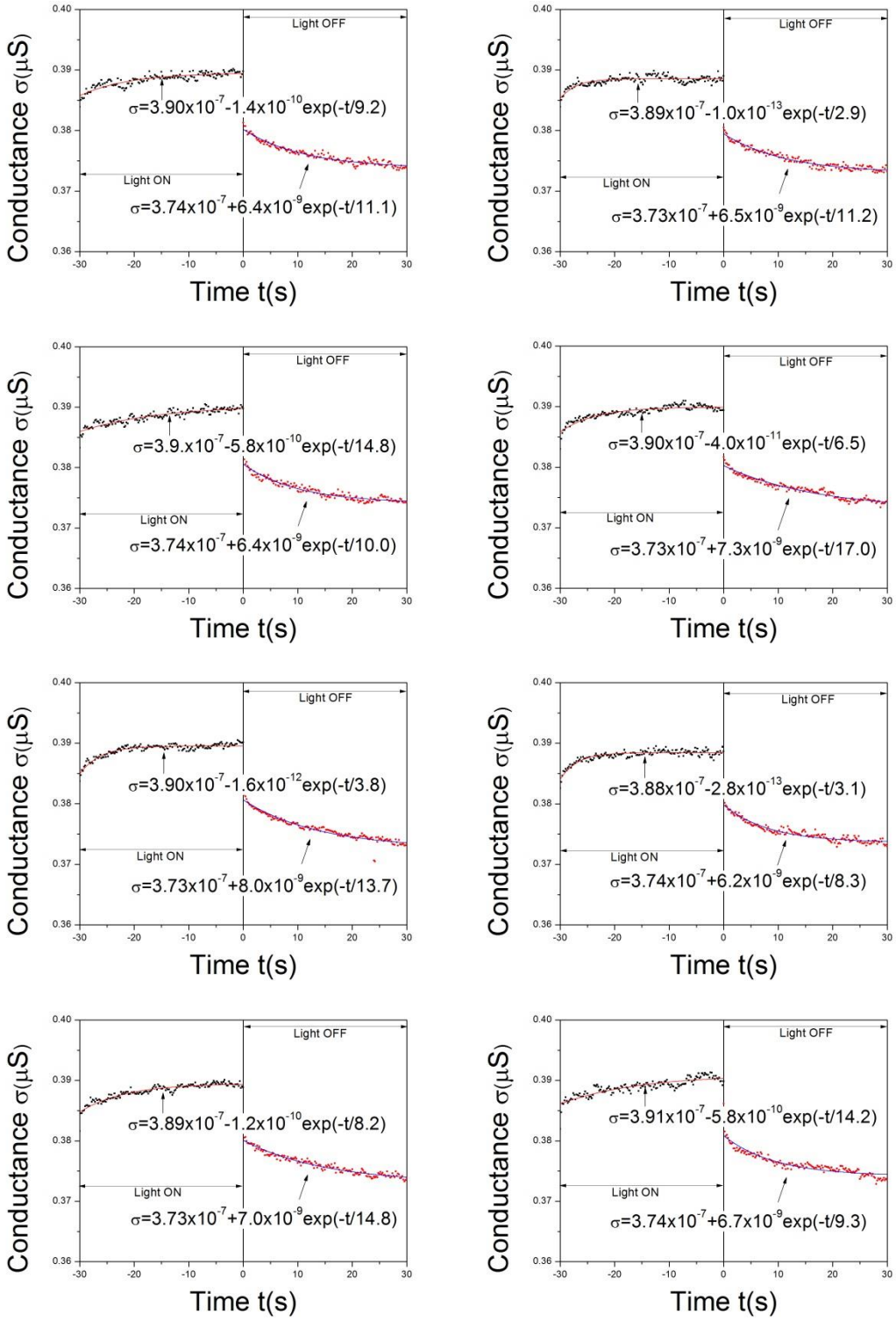

Figure S10. Experimental data fitting under light illumination intensity of 12W/cm^2

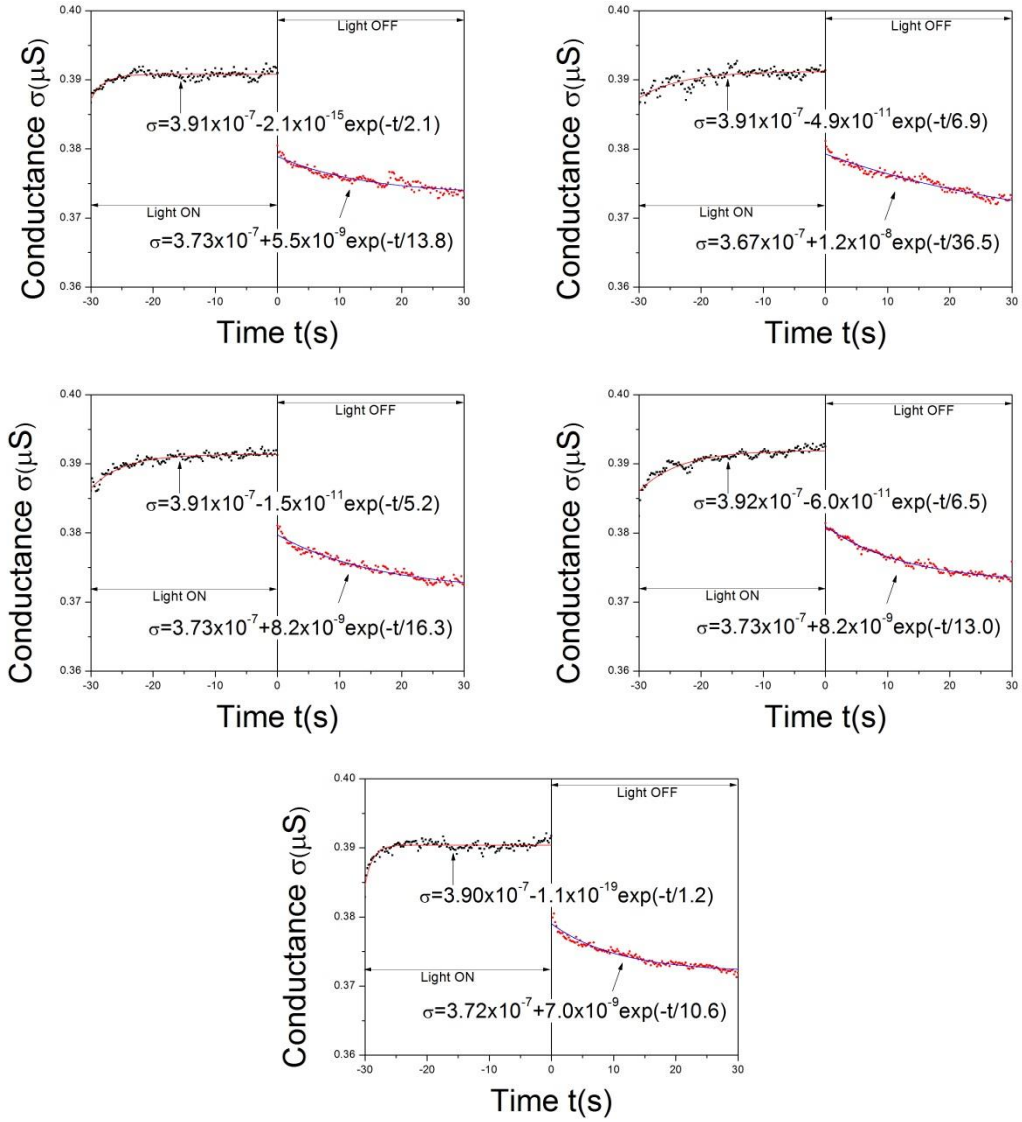

Figure S11. Experimental data fitting under light illumination intensity of 17W/cm^2

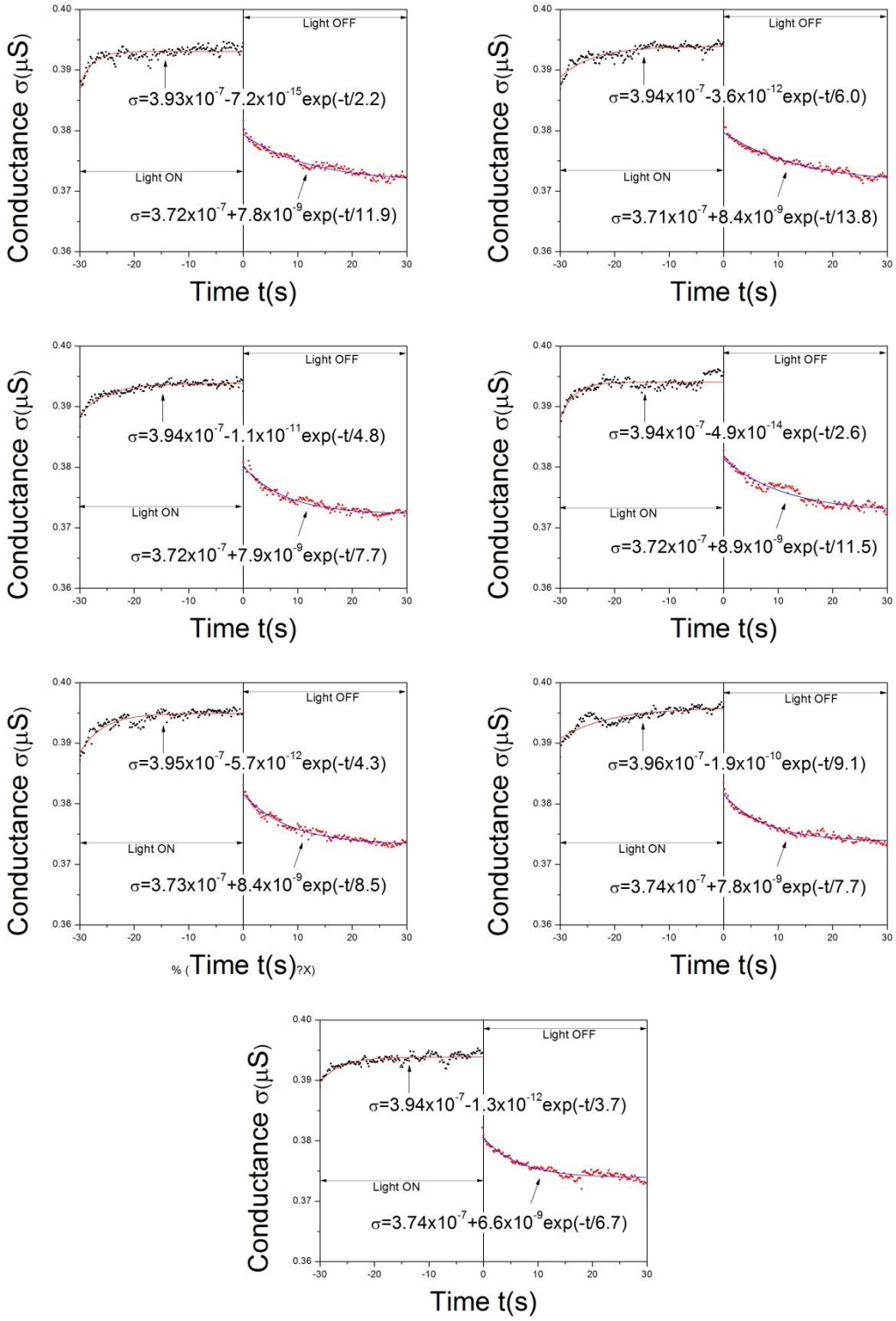

Figure S12. Experimental data fitting under light illumination intensity of 22W/cm^2

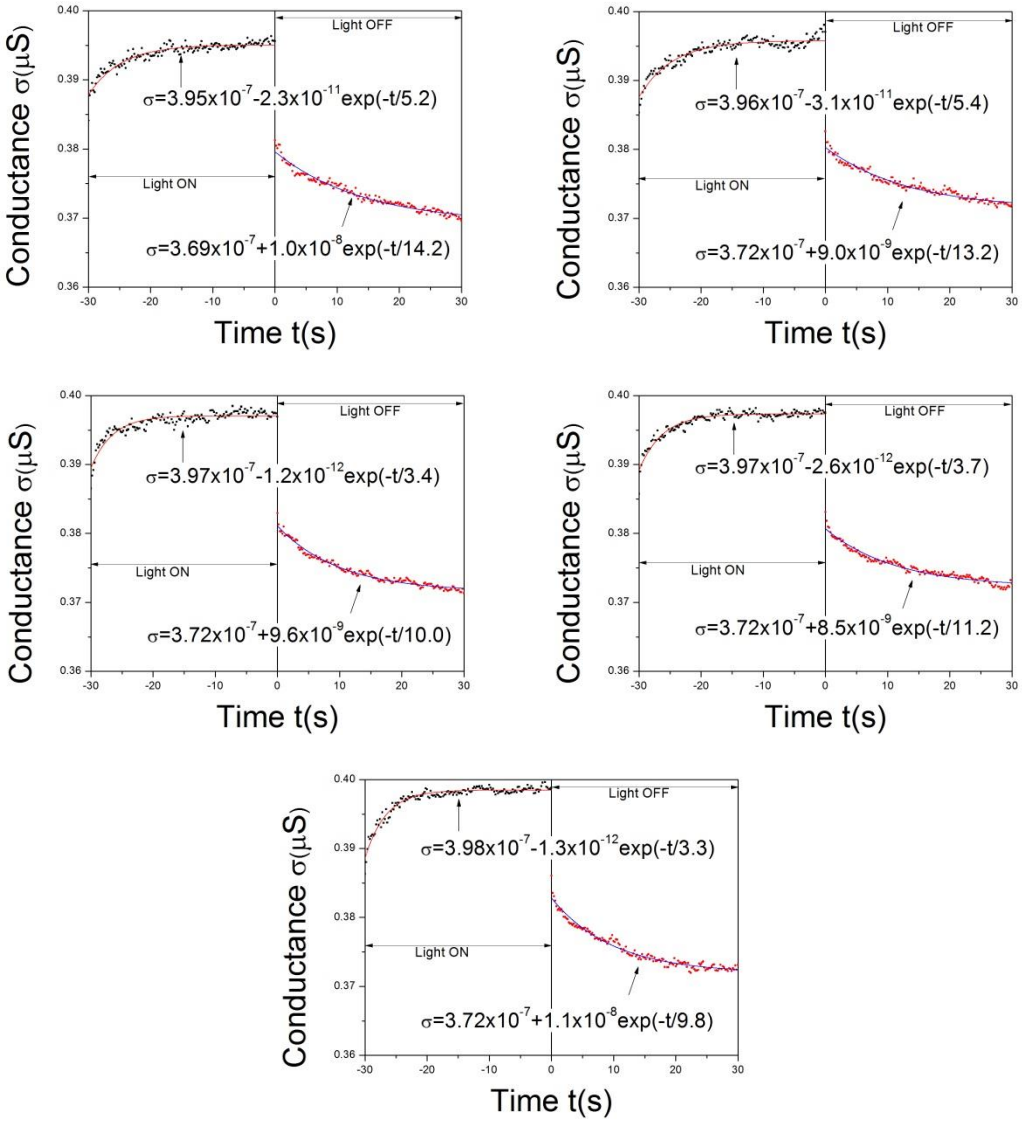

Figure S13. Experimental data fitting under light illumination intensity of 28W/cm^2

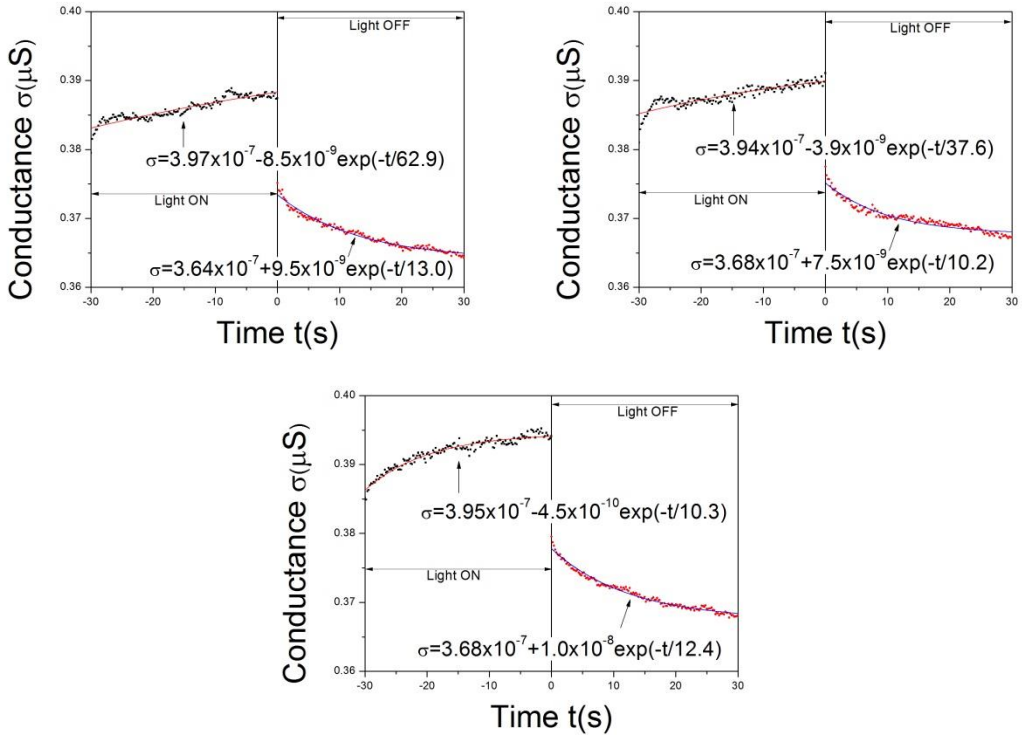

Figure S14. Experimental data fitting under light illumination intensity of 31W/cm^2