Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary information for

Mechanistic insights into perovskite photoluminescence enhancement: light curing with oxygen can boost yield thousandfold

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1. SEM image of perovskite crystals

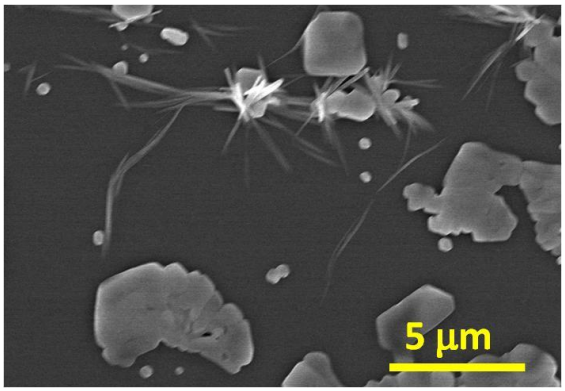

Figure S1. SEM image of a perovskite sample prepared using the same procedure as the samples for the PL measurements.

2. PL decay kinetics during the light-induced PL enhancement

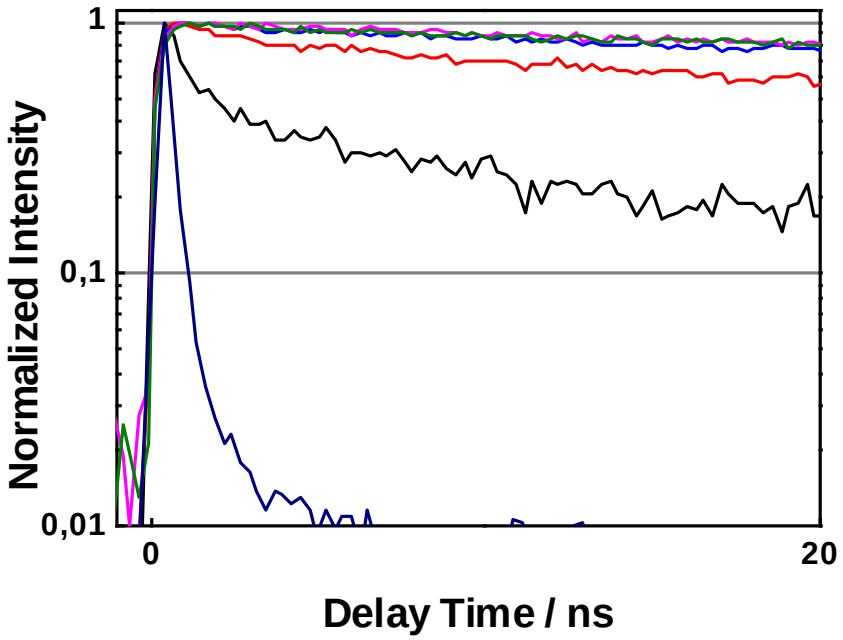

Figure S2. Normalized PL decay curves in the course of PL enhancement (the same data as shown in Fig. 3 in the main text). IFR width was 300 ps limited by the digitization (256 ps per channel) in the TCSPC.

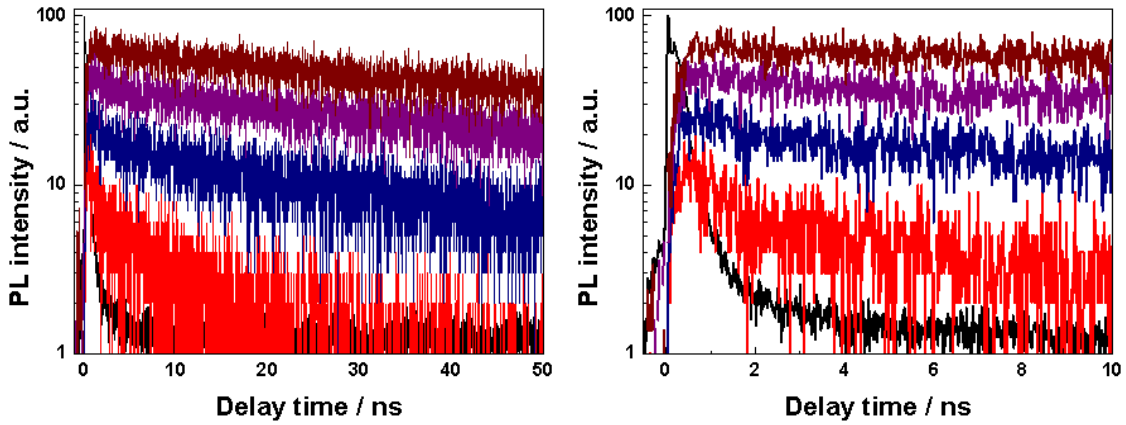

Figure S3. PL decay dynamics with the best possible resolution using our setup (16 ps per channel, IRF width is determined by the pulse width and the response of electronics to about 100 ps) at different time points during the PL enhancement. The collection time for each curve was the same, so the intensities can be compared. The black curves show the IRF.

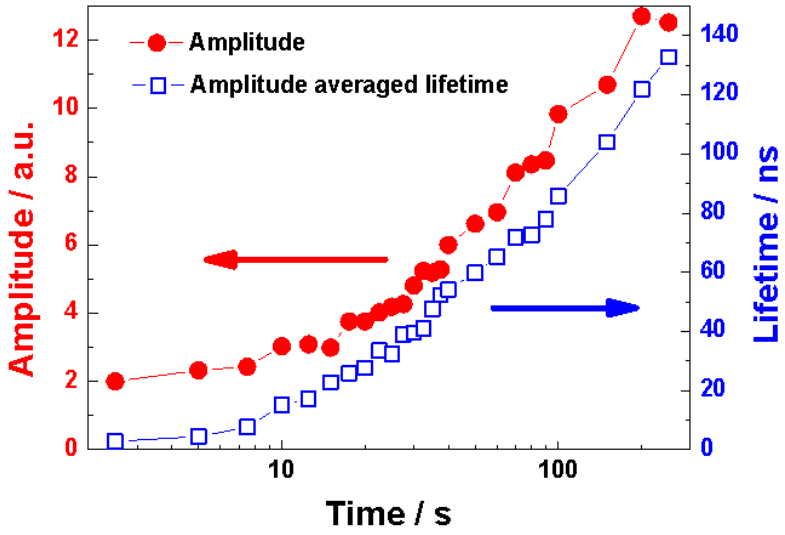

Figure S4. Amplitude averaged lifetime (open squares) and initial amplitude (solid circles) of the PL dynamics during the PL enhancement (the same data as shown in Fig. 3). The parameters were obtained from tri-exponential fit of the kinetics.

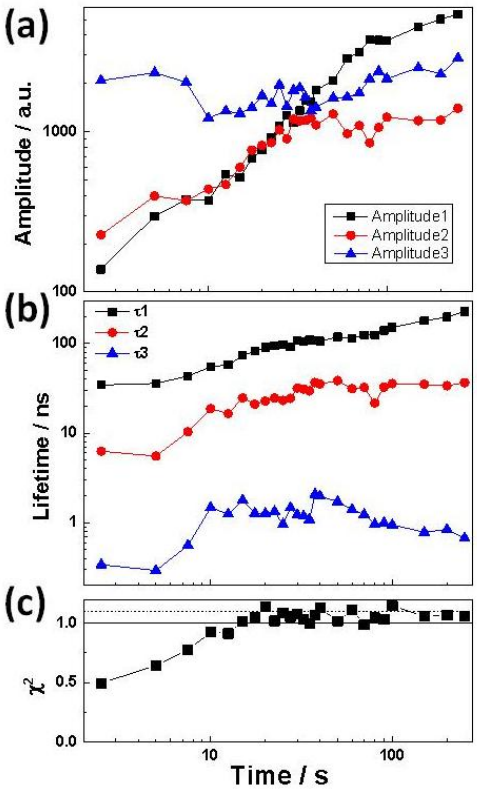

Figure S5. Parameters of the tri-exponential fit applied the PL dynamics during the PL enhancement (the same data as in Fig.3). The quality of the fit (χ^2 values) were also shown in (c).

3. Effect of atmosphere on the light-induced PL enhancement

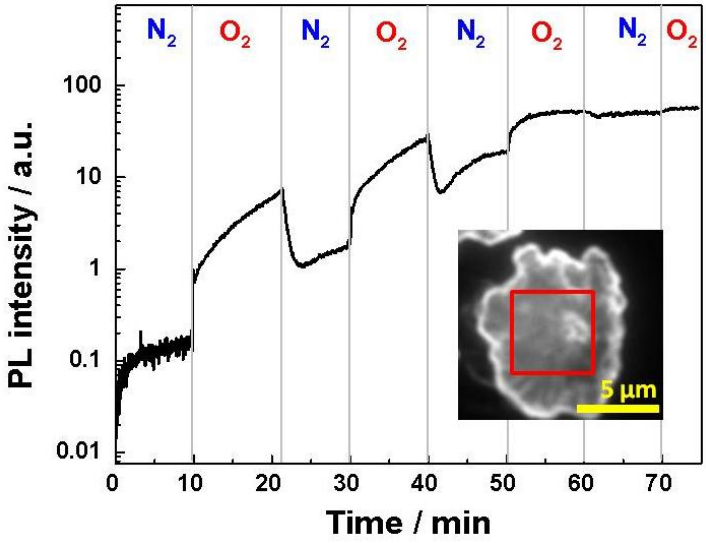

Figure S6. The same data as in Fig. 5 but in logarithmic scale. The atmosphere was switched between N_2 and O_2 at the time moments indicated by the gray vertical lines. The sample was continuously irradiated

by the excitation light at 0.2 W/cm^2. Inset shows the PL micrograph of the sample and the selected region (red square) taken for the analysis. The sample was kept in N_2 for 5 min before the experiment.

4. PL intensity transient during the checking up period for the experiment shown in Fig. 7c.

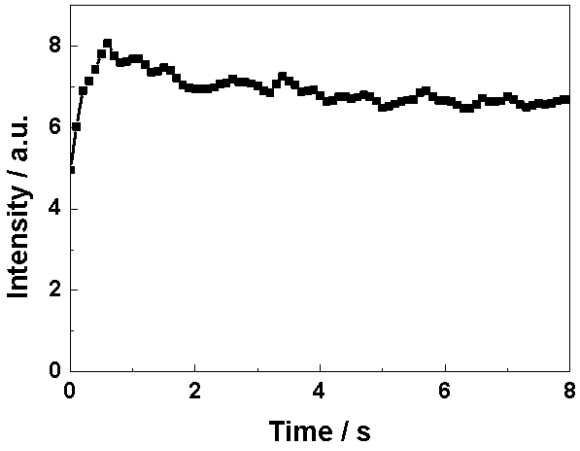

Figure S7. PL dynamics of the short period (10 s) exposure to light excitation. 100 ms per data point. The maximum value was used for the data points shown in Fig. 7c.