

Supporting Information

# **Fast responsive and highly efficient optical upconverter based on phosphorescent OLED**

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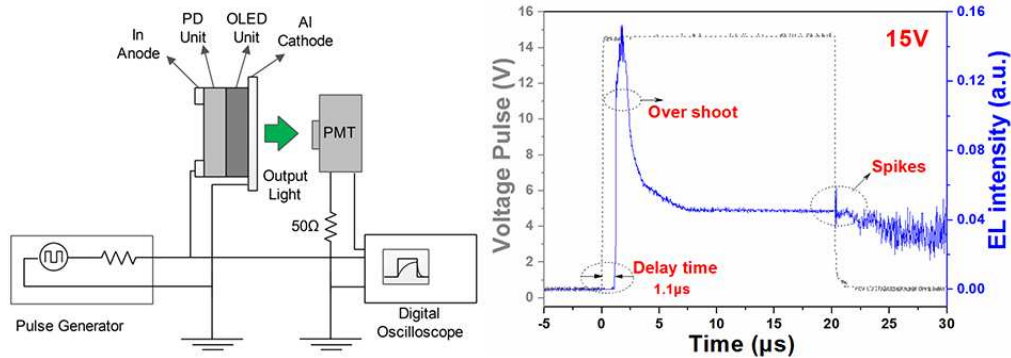


Figure S1. Transient EL response of the Phosphorescent Device under electric pulse at 15V.

Transient EL response to the voltage pulse have been designed and investigated, as shown in figure S1. Unlike working in the upconversion mode (DC driven, IR pulse irradiated), a delay time of  $1.1\mu\text{s}$  can be clearly seen under electric pulse at 15V. It decreases as the amplitude of the applied voltage pulse is increased. This delay time is often being interpreted as the transit time of electrons and is used to calculate their mobility. After a fast initial rise, an overshoot can be observed before the transient EL becomes saturated. Similarly, the saturation in EL occurs faster if the applied voltage is higher. When electric pulse turns off, fast recombination of accumulated carriers causes other spikes. The understanding of these processes may give a better insight into the kinetics of carriers and excitons.