

Supporting Information for

Origin and Suppression of External Quantum Efficiency Roll-Off in Quasi-Two-Dimensional Metal Halide Perovskite Light-Emitting Diodes

Satoru Watanabe^{1,2}, Ganbaatar Tumen-Ulzii^{1,2}, Tai Cheng^{1,2}, Toshinori Matsushima^{2,3,*},
Chihaya Adachi^{1-3,*}

¹Center for Organic Photonics and Electronics Research (OPERA), Kyushu University,
744 Motoooka, Nishi, Fukuoka 819-0395, Japan

²Japan Science and Technology Agency (JST), ERATO, Adachi Molecular Exciton
Engineering Project, 744 Motoooka, Nishi, Fukuoka 819-0395, Japan

³International Institute for Carbon-Neutral Energy Research (WPI-I²CNER), Kyushu
University, 744 Motoooka, Nishi, Fukuoka 819-0395, Japan

*Author to whom correspondence should be addressed: adachi@cstf.kyushu-u.ac.jp or
tmatusim@i2cner.kyushu-u.ac.jp

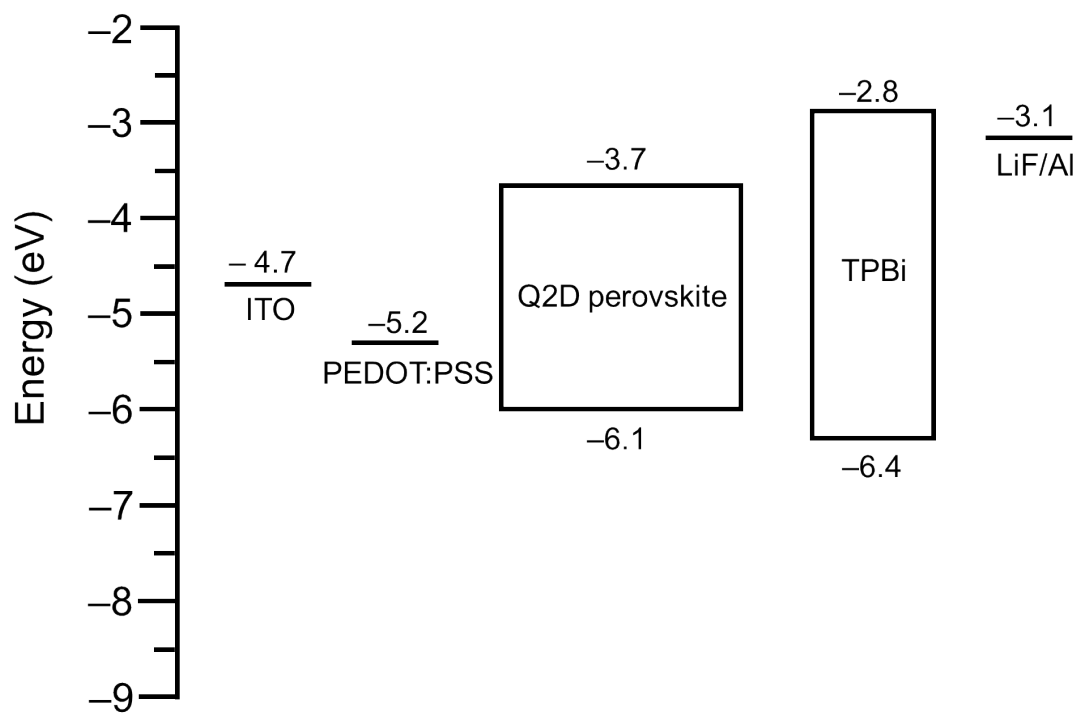


Figure S1. Energy-level diagram of a Pe-LED. These energy levels are taken from refs. S1 and S2.

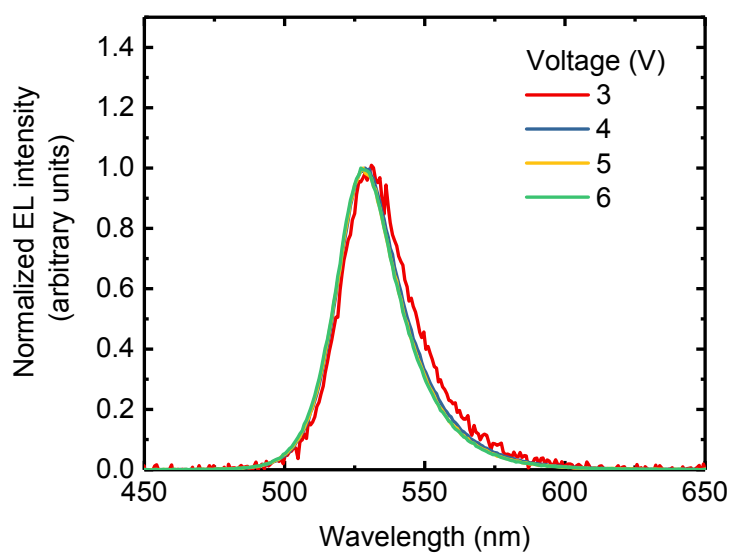


Figure S2. EL spectra measured under positive-voltage application to Pe-LEDs.

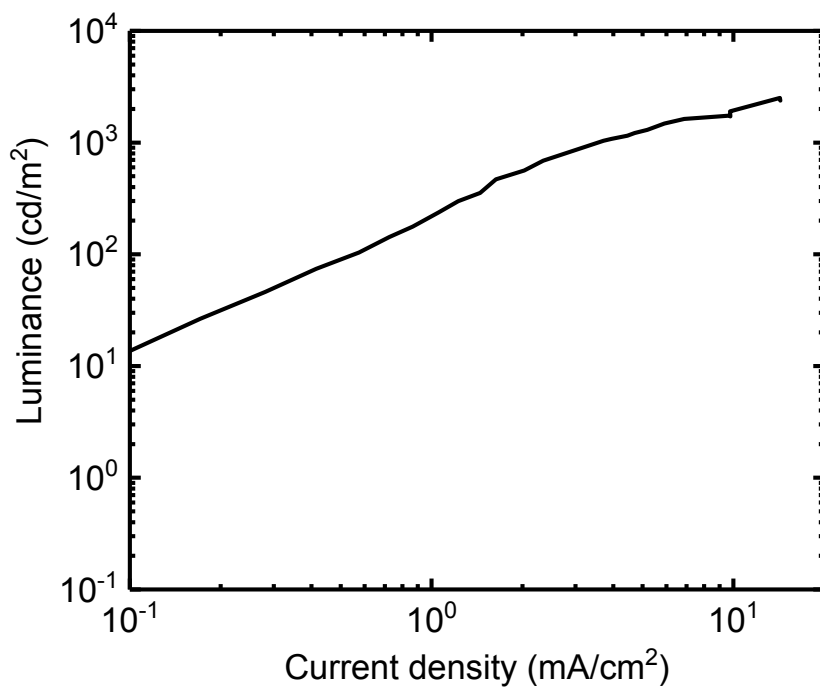


Figure S3. Current density–luminance curve of Pe-LEDs under device operation with positive voltages.

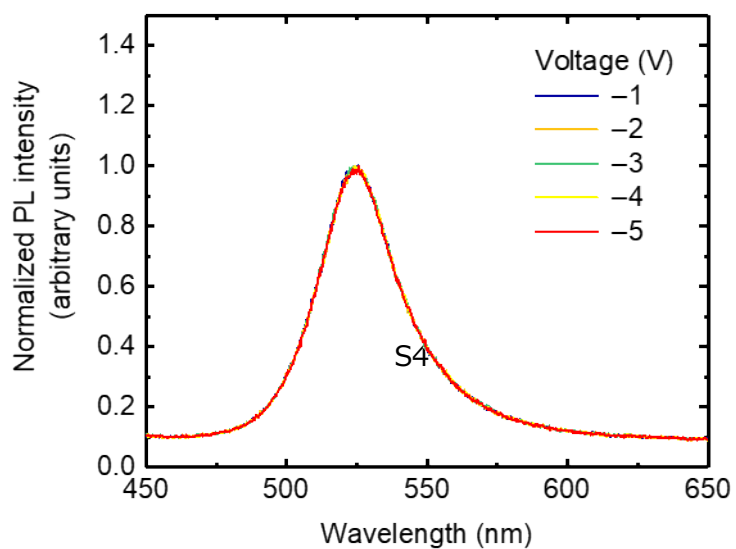


Figure S4. PL spectra measured when negative voltages were applied to Pe-LEDs under 365 nm photoexcitation.

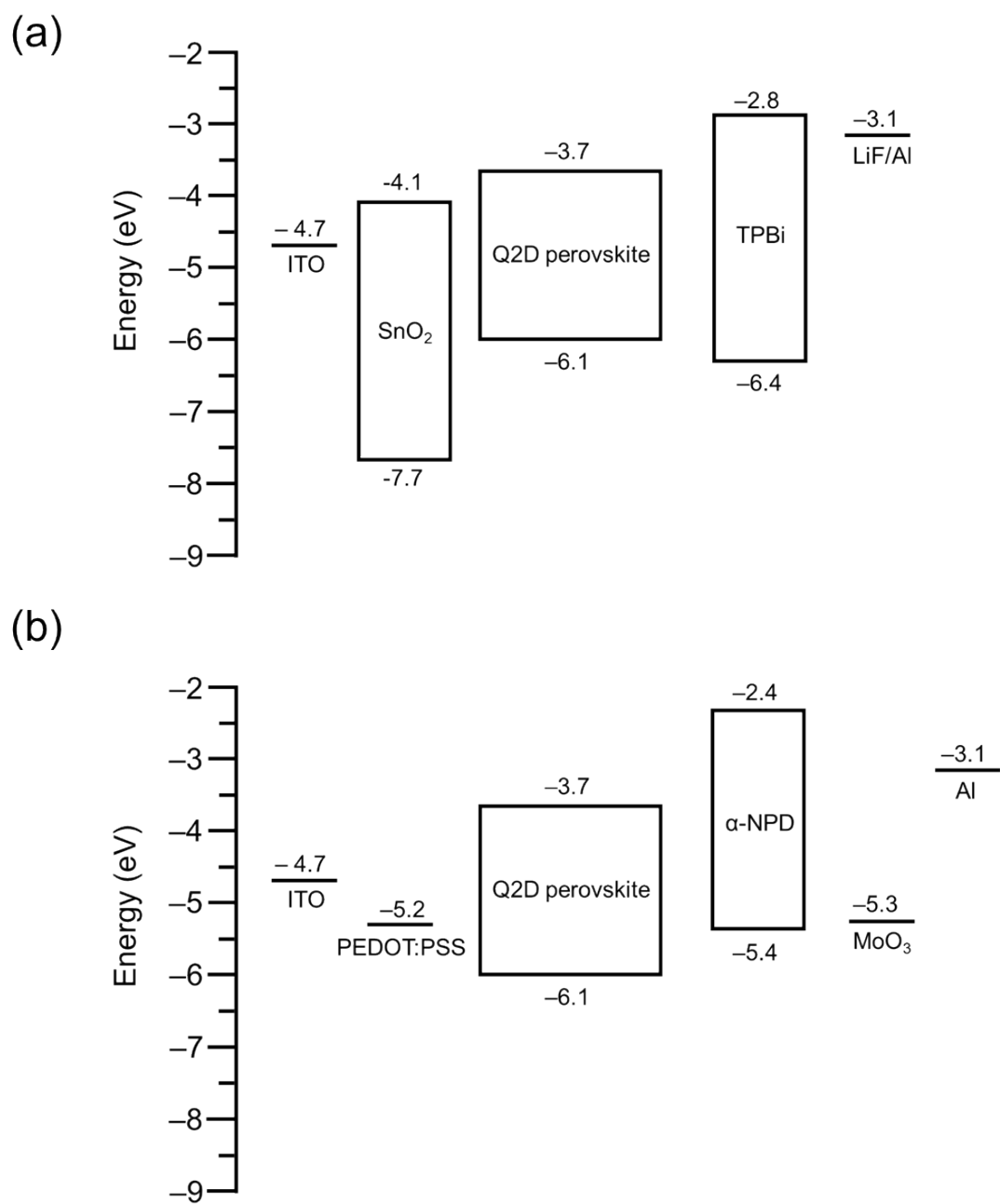


Figure S5. Energy-level diagrams of (a) EODs and (b) HODs. These energy levels are taken from refs. S1–S5.

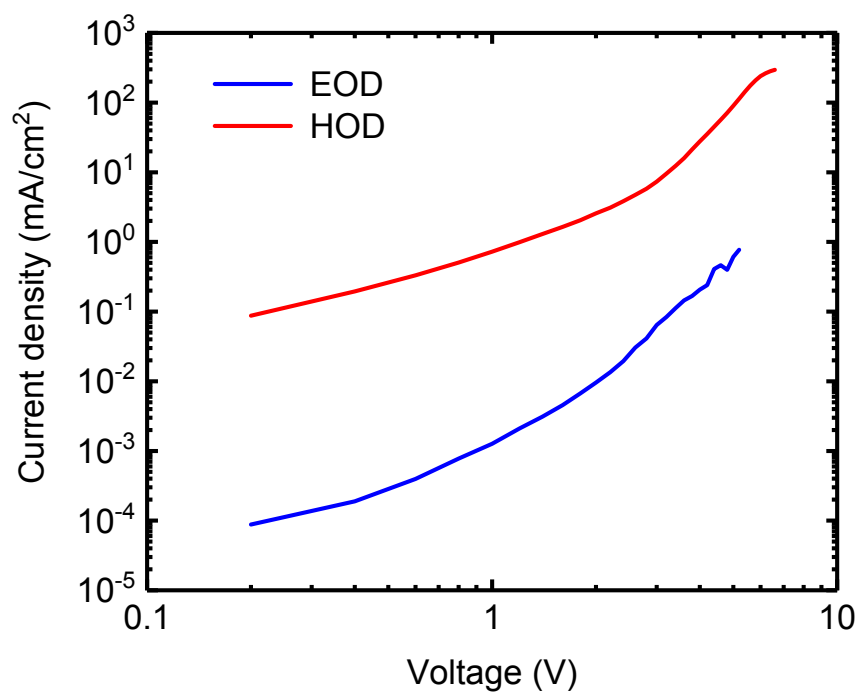
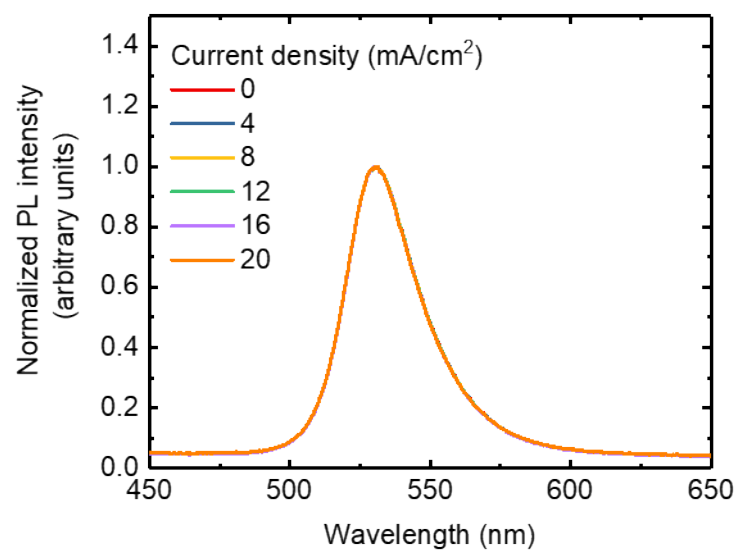


Figure S6. J - V characteristics of EODs and HODs measured under the positive-voltage application.

(a)



(b)

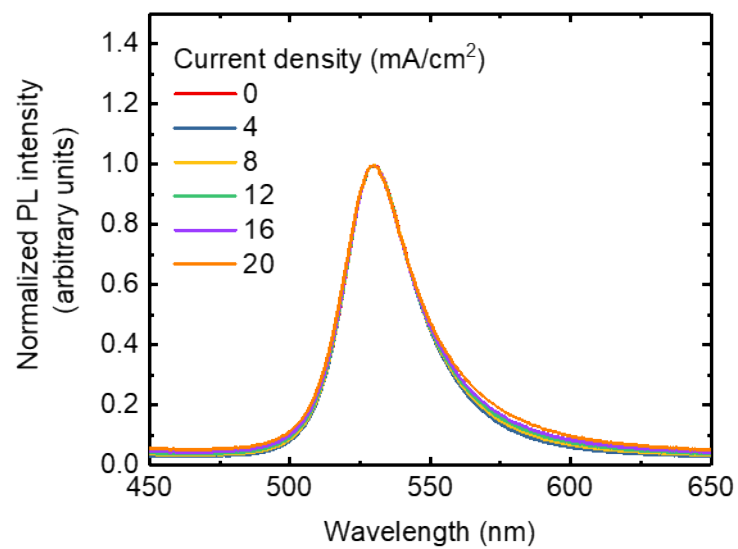


Figure S7. PL spectra measured from (a) EODs and (b) HODs under 365-nm photoexcitation and positive-voltage application.

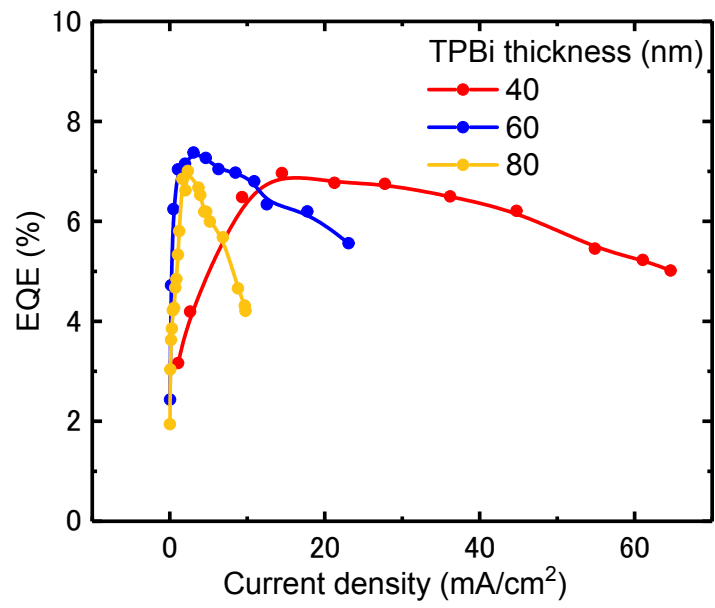


Figure S8. Original EQE– J curves of Pe-LEDs with different thicknesses of the TPBi ETLs.

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