Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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Supporting Information

Molecular Engineering of Naphthalene Spacers in Low-Dimensional Perovskites

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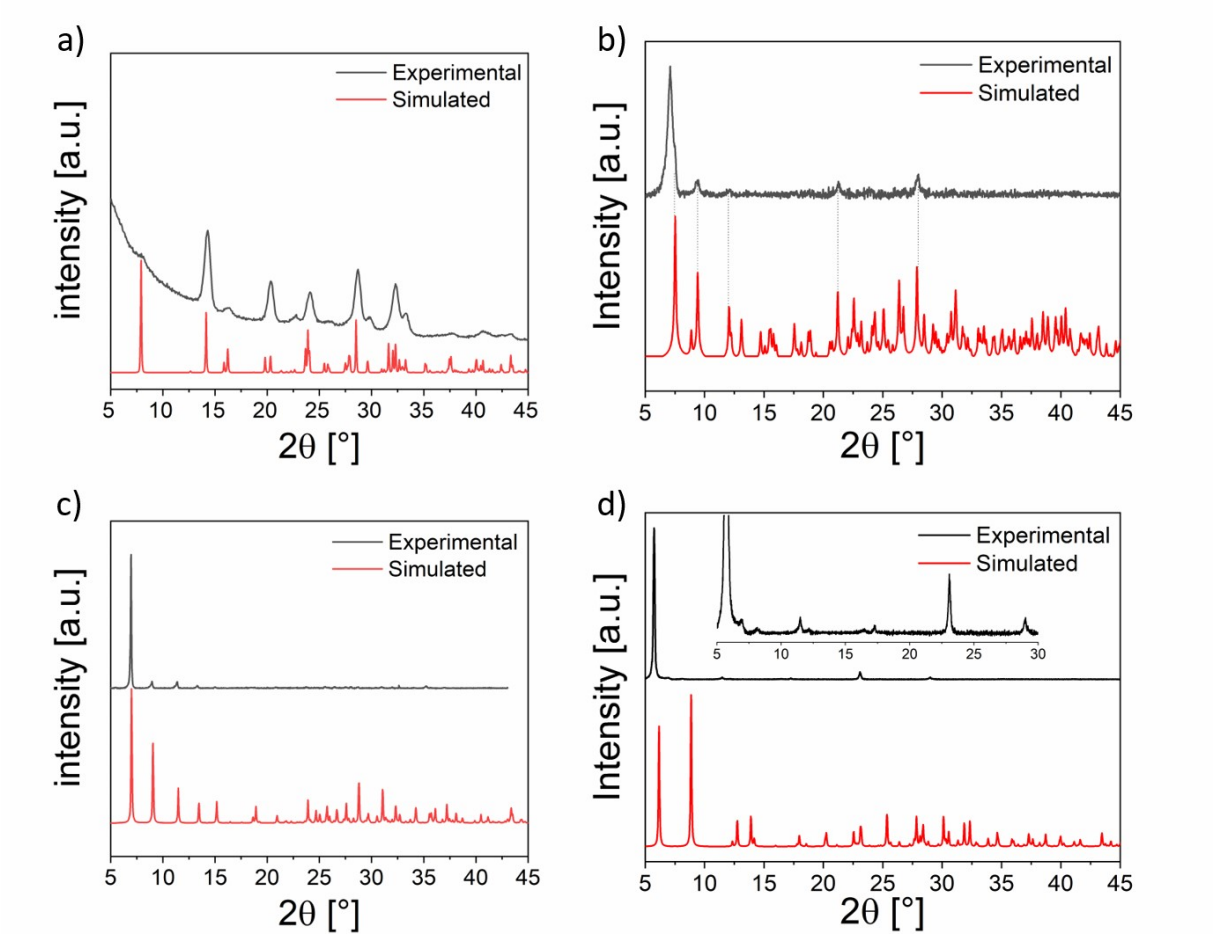

Figure S1. The simulated and experimental XRD patterns of (a) (1,5-DAN)PbI_4, (b) (2,6-DAN)PbI_4, (c) (1-AN)PbI_3 and (d) (2-AN)PbI_3 perovskite.

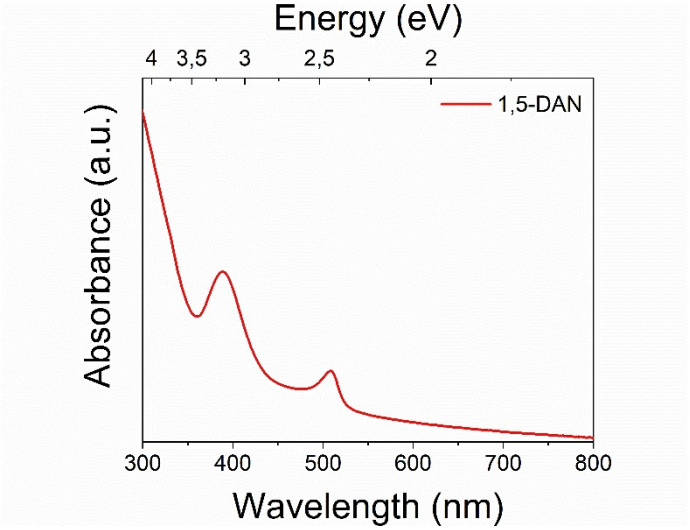

Figure S2. UV−vis absorption of (1,5-DAN)PbI_4 thin film annealed at 150 °C.

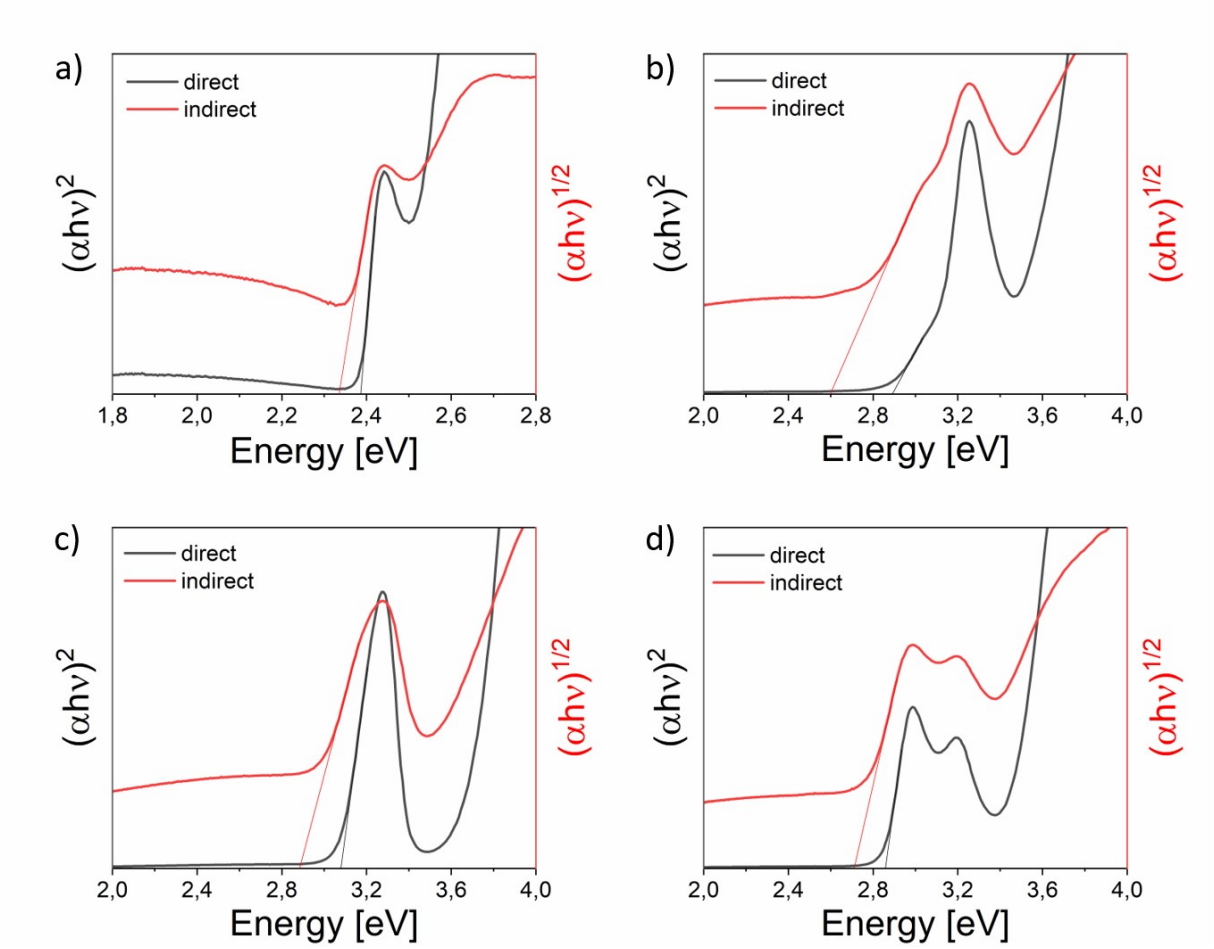

Figure S3. Tauc plots for the absorption spectra of (a) (1,5-DAN)PbI_4, (b) (2,6-DAN)PbI_4, (c) (1-AN)PbI_3 and (d) (2-AN)PbI_3 perovskite assuming a direct (black) and an indirect (red) band gap.

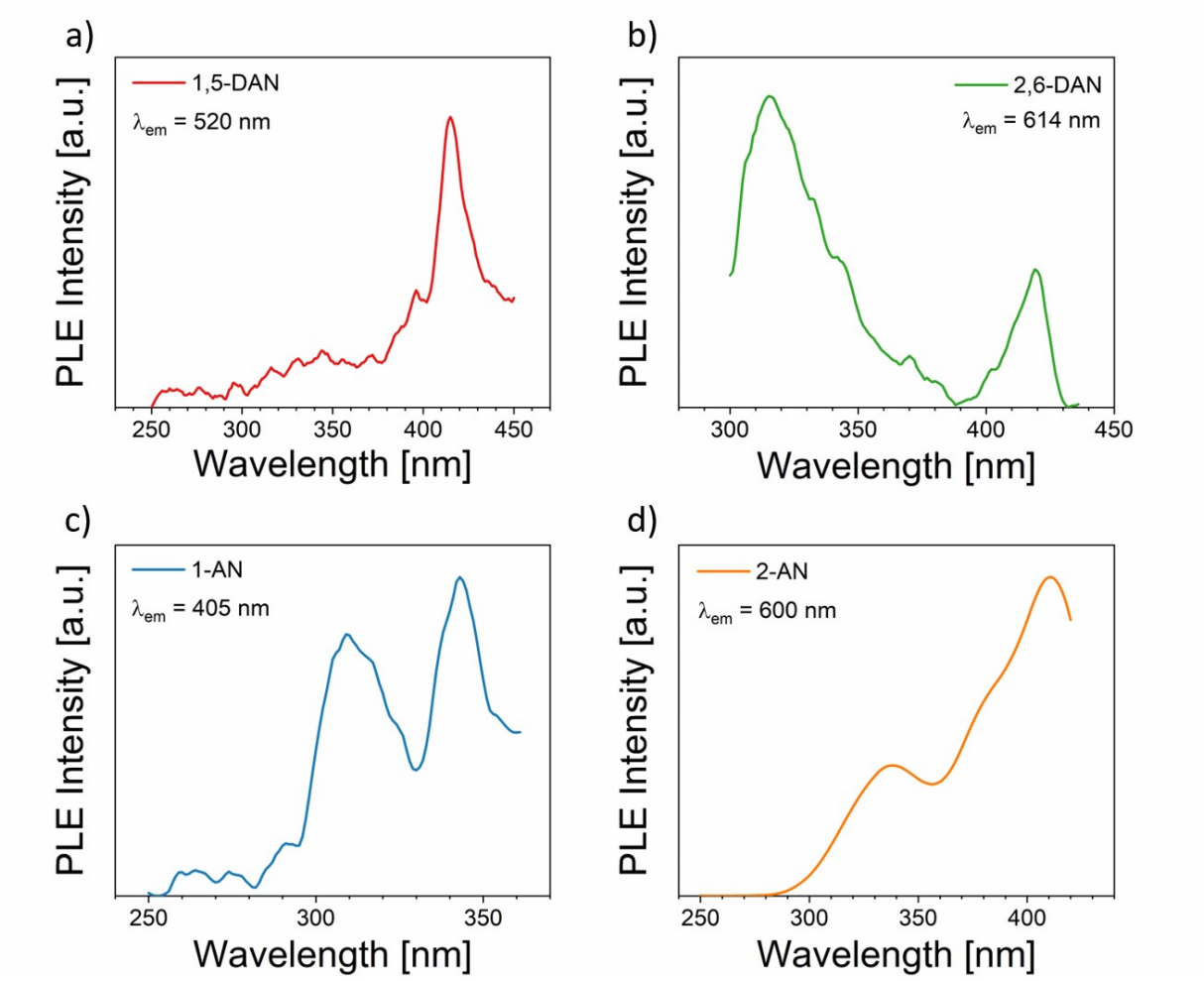

Figure S4. PL excitation (PLE) spectra of (a) (1,5-DAN)PbI_4, (b) (2,6-DAN)PbI_4, (c) (1-AN)PbI_3 and (d) (2-AN)PbI_3. Probe wavelength (λ_{em}) are indicated on the graphs.

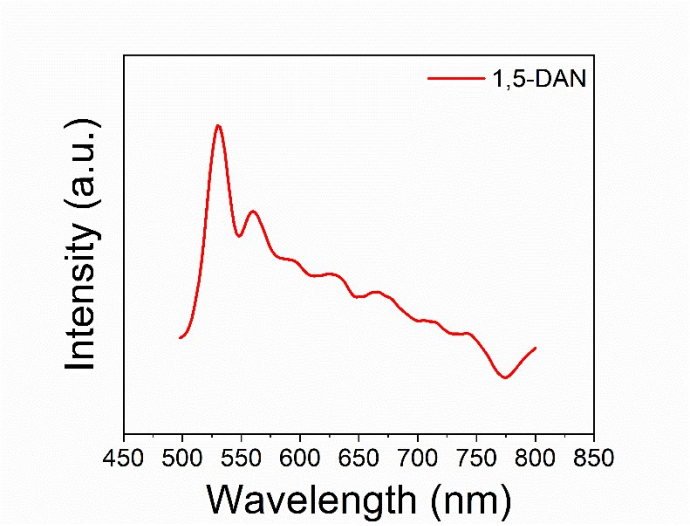

Figure S5. PL spectrum of (1,5-DAN)PbI_4 excited with a Xe lamp at 420 nm.

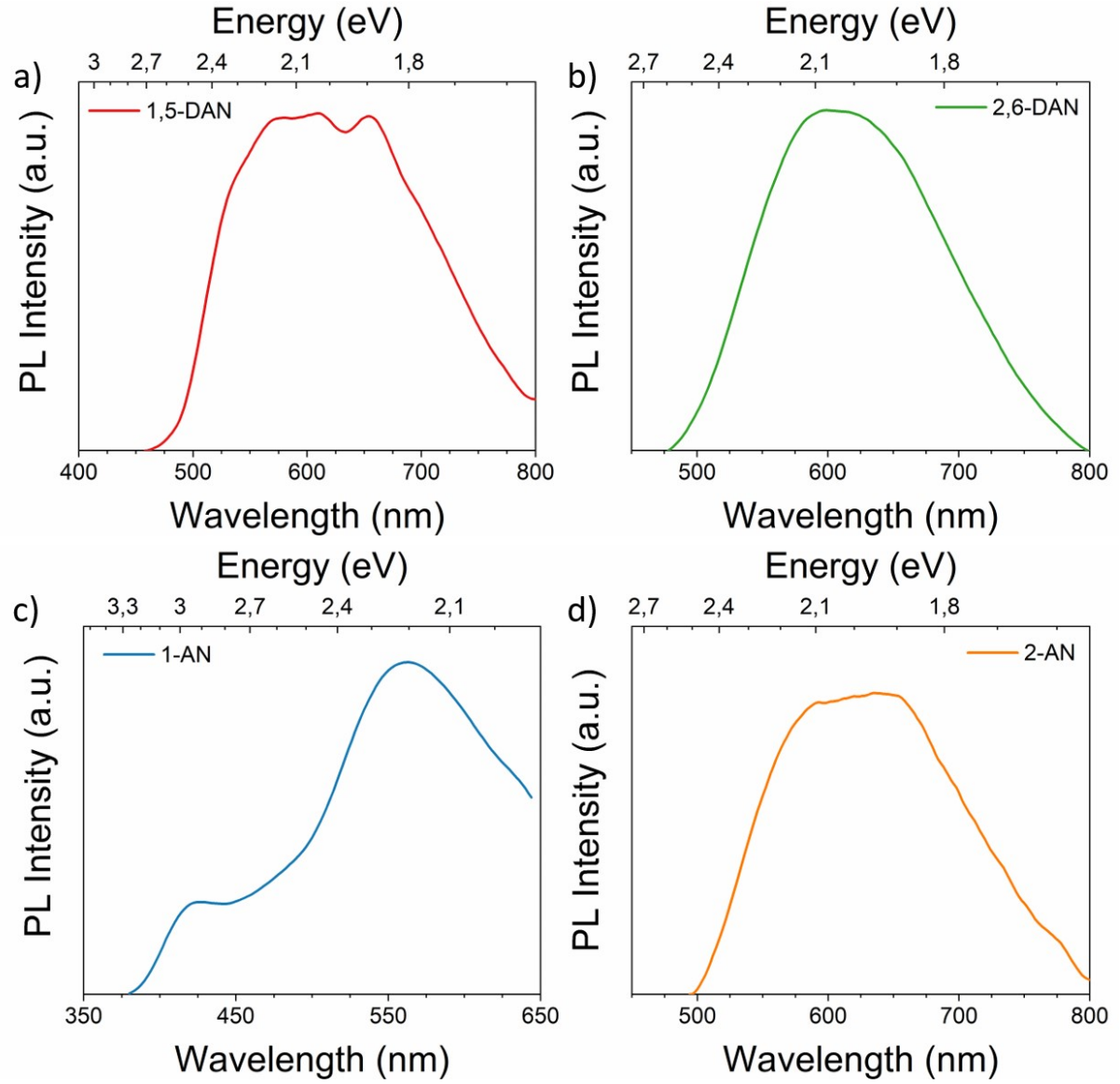

Figure S6. PL spectra acquired at 300K of (a) (1,5-DAN)PbI_4, (b) (2,6-DAN)PbI_4, (c) (1-AN)PbI_3 and (d) (2-AN)PbI_3.

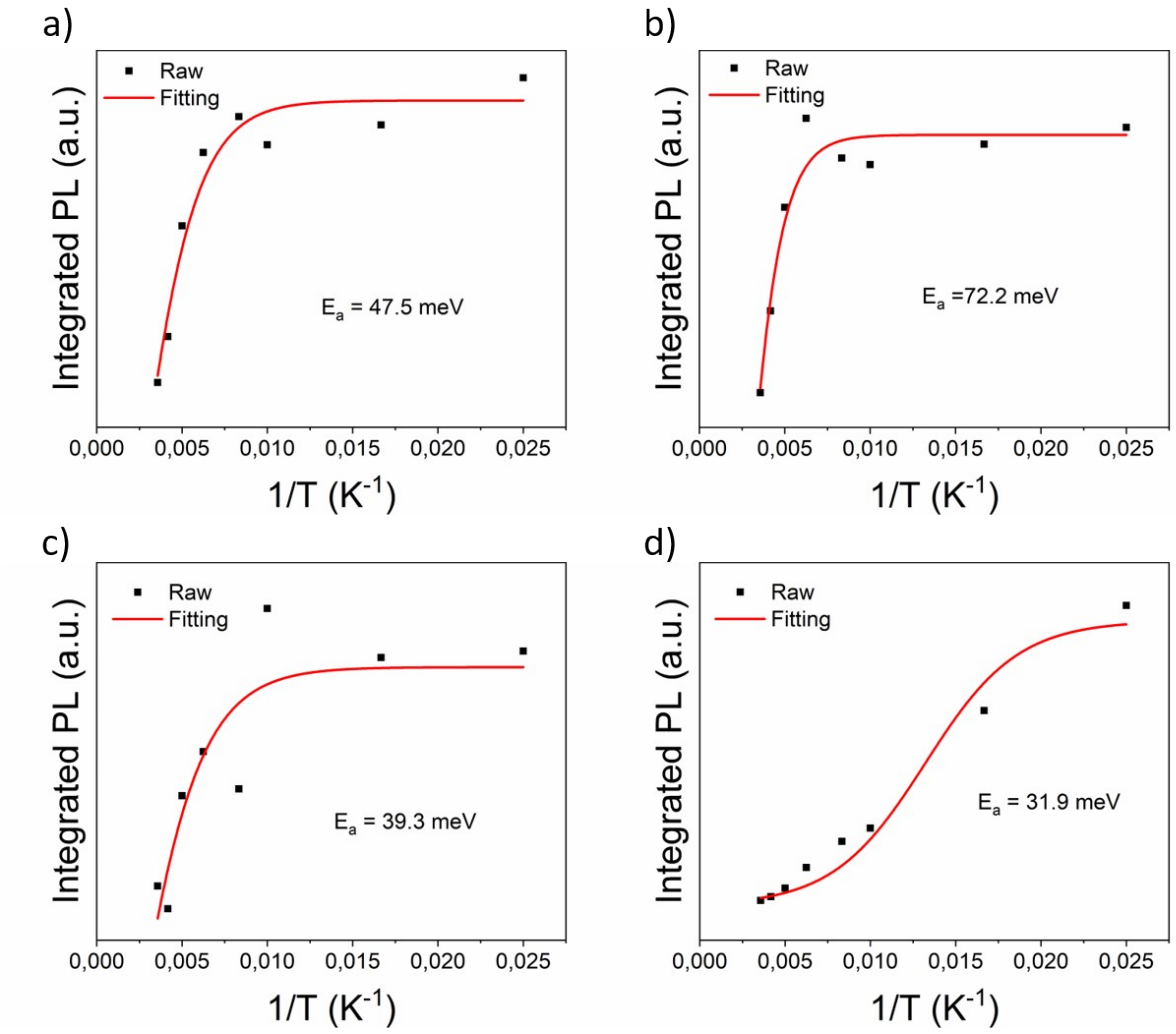

Figure S7. Integrated PL intensity as a function of reciprocal temperature of compounds (a) (1,5-DAN)PbI_4, (b) (2,6-DAN)PbI_4, (c) (1-AN)PbI_3 and (d) (2-AN)PbI_3.

Table S1. Comparison of the distortion parameters of the low-dimensional halide perovskites.

compound	Δd	σ^2_{oct}	ref
(1,5-DAN)PbI_4	9.1126×10^{-5}	7.17	[1]
(2,6-DAN)PbI_4	1.6773×10^{-3}	12.95	this work
(1-AN)PbI_3	1.9850×10^{-4}	16.73	this work
(2-AN)PbI_3	1.0151×10^{-3}	13.02	this work

Reference

(1) Lemmerer, A.; Billing, D. G. Lead Halide Inorganic-Organic Hybrids Incorporating Diammonium Cations. *CrystEngComm* **2012**, *14* (6), 1954–1966.