Orientation control of two-dimensional perovskites by incorporating carboxylic acid moieties

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Elemental analysis data of compounds

Elemental analysis data for $[HOOC(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 3$), $C_6H_{16}N_2PbI_6$; Calc. C 8.05, H 1.80, N 3.13, I 56.72%, Exp. C 8.40, H 1.69, N 3.20, I 54.70%.

Elemental analysis data for $[HOOC(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 4$), $C_8H_{20}N_2PbI_6$; Calc. C 10.41, H 2.18, N 3.03, I 54.99%, Exp. C 10.46, H 1.62, N 2.99, I 55.69%.

Elemental analysis data for $[HOOC(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 7$), $C_{14}H_{32}N_2PbI_6$; Calc. C 16.69, H 3.20, N 2.78, I 50.40%, Exp. C 16.52, H 2.80, N 2.69, I 50.79%.

Elemental analysis data for $[CH_3(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 3$), $C_6H_{20}N_2PbI_6$; Calc. C 8.63, H 2.41, N 3.35, I 60.79%, Exp. C 7.99, H 1.71, N 3.04, I 59.74%.

Elemental analysis data for $[CH_3(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 4$), $C_8H_{24}N_2PbI_6$; Calc. C 11.13, H 2.80, N 3.25, I 58.81%, Exp. C 10.80, H 2.58, N 3.11, I 57.78%.

Elemental analysis data for $[CH_3(CH_2)_{n-1}NH_3I]_2PbI_4$ ($n = 7$), $C_{14}H_{36}N_2PbI_6$; Calc. C 17.75, H 3.83, N 2.96, I 53.59%, Exp. C 17.96, H 3.25, N 3.14, I 52.26%.

(a)

$d\ (\text{Å}) = 2.20\ n + 3.30$
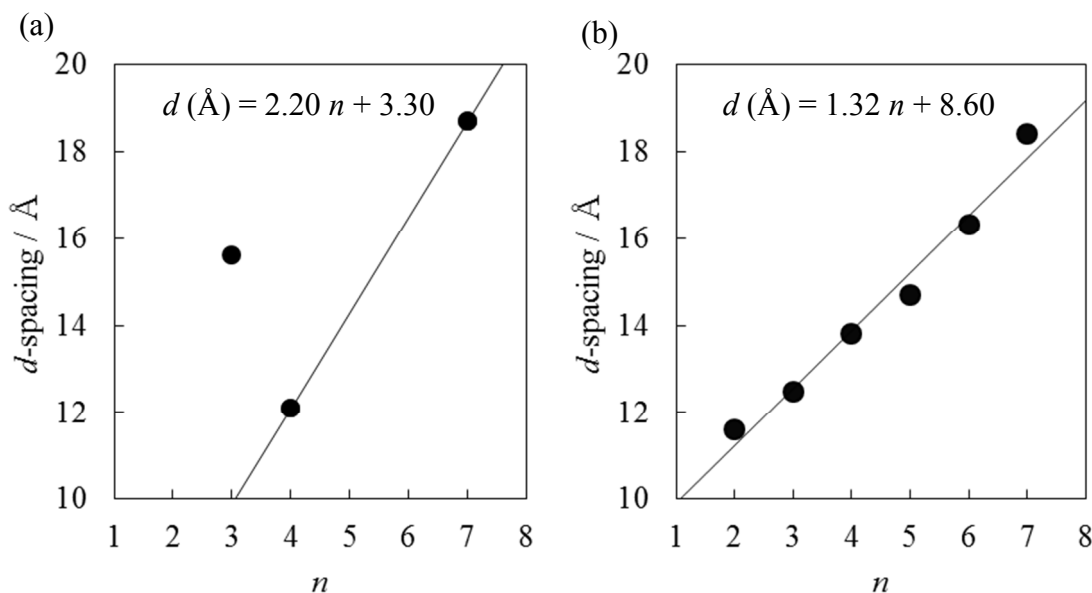
(b)

$d\ (\text{Å}) = 1.32\ n + 8.60$

Figure S1. D-spacing values of (a) $[HOOC(CH_2)_{n-1}NH_3]_2PbI_4$ and (b) $[CH_3(CH_2)_{n-1}NH_3]_2PbI_4$ films as a function of carbon atoms in organic amines.
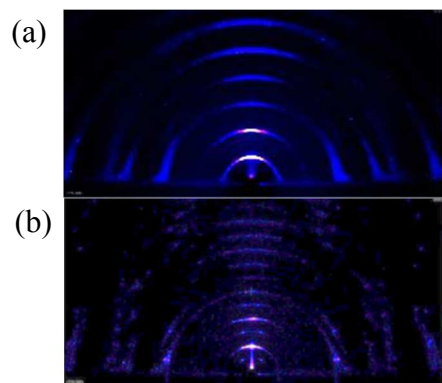
Figure S2. 2D WAXS images of (a) $[HOOC(CH_2)_6NH_3]_2PbI_4$ and (b) $[CH_3(CH_2)_6NH_3]_2PbI_4$ ($n = 7$) films.