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

Table S1. Crystal structure data and single-crystal X-ray diffraction refinement results for Cs_4EuBr_6 and Cs_4EuI_6.

Formula	Cs_4EuBr_6	Cs_4EuI_6
fw (g)	1163.03	1445.01
T (K)	250(1)	250(1)
Crystal system	Trigonal	Trigonal
space group	$R\bar{3}c$	$R\bar{3}c$
a (Å)	13.7406(4)	14.5994(2)
b (Å)	13.7406(4)	14.5994(2)
c (Å)	17.3413(5)	18.3443(3)
α (°)	90	90
β (°)	90	90
γ (°)	120	120
V (Å^3)	2835.4(13)	3386.1(10)
Z	6	6
D_{calc} (mgm^{-3})	4.087	4.252
μ (Mo Kα) (mm^{-1})	11.778	17.312
F(000)	2958	3606
Crystal size (mm)	0.2×0.1×0.05	0.2×0.15×0.05
θ range for data collection	3.52-32.59	3.41-32.00
Index ranges	$-20 \le h \le 16$ $-19 \le k \le 20$ $-25 \le l \le 25$	$-21 \le h \le 21$ $-19 \le k \le 20$ $-26 \le l \le 25$
No. reflections collected (equivalents agreement)	7379(0.025)	12517(0.053)
No. reflections collected with $\|F_o\| > 4\sigma\|F_o\|$	1002	1022
No. of variables	19	20
R_F	0.021	0.028
R_{wF}	0.049	0.076
Goodness of fit	1.11	1.17
largest diff. peak and hole (eÅ^{-3})	0.95, -1.78	1.86, -1.84

Table S2. Fractional atomic coordinates and equivalent isotropic displacement parameters for Cs_4EuBr_6.

Atom	Site	*x*	*y*	*z*	U_{eq}(Å^2)
Eu1	6b	0	0	0	0.01733(8)
Cs1	6a	0	0	-1/4	0.03699(14)
Cs2	18e	0.03875(2)	0.70542(2)	1/12	0.02798(8)
Br1	36f	0.02775(3)	0.83628(3)	0.101204(19)	0.02696(9)

Table S3. Fractional atomic coordinates and equivalent isotropic displacement parameters for Cs_4EuI_6.

Atom	Site	*x*	*y*	*z*	U_{eq}(Å^2)
Eu1	6b	0	0	0	0.02062(16)
Cs1	6a	0	0	-1/4	0.0423(3)
Cs2	18e	0.04371(4)	0.71037(4)	1/12	0.03349(16)
I1	36f	0.03089(3)	0.83596(3)	0.10260(2)	0.03057(15)