Supplementary Materials

$CsPbBr_3$ nanocrystals-based polymer nanocomposite films: effect of polymer on spectroscopic properties and moisture tolerance

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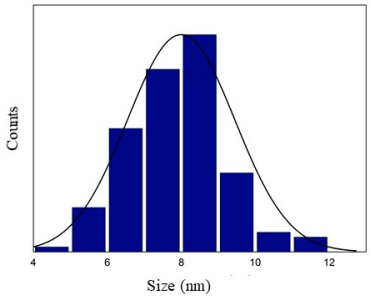


Figure S1. $CsPbBr_3$ nanocrystals size distribution by size statistical analysis of the TEM micrographs reported in Figure 1a in the main manuscript.

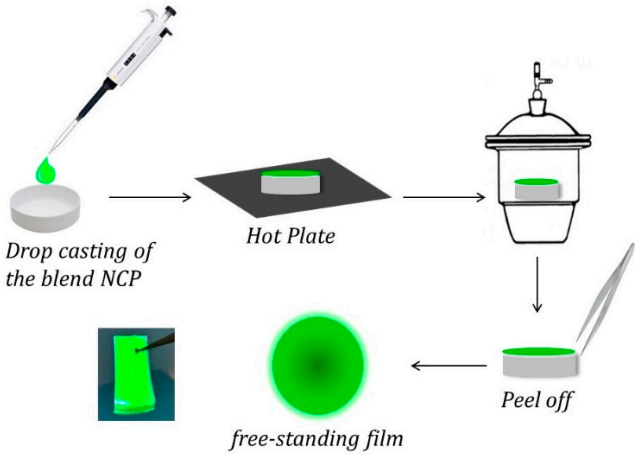


Figure S2. Sketch of the $CsPbBr_3$ nanocrystal/polymer blend processing into free-standing films.

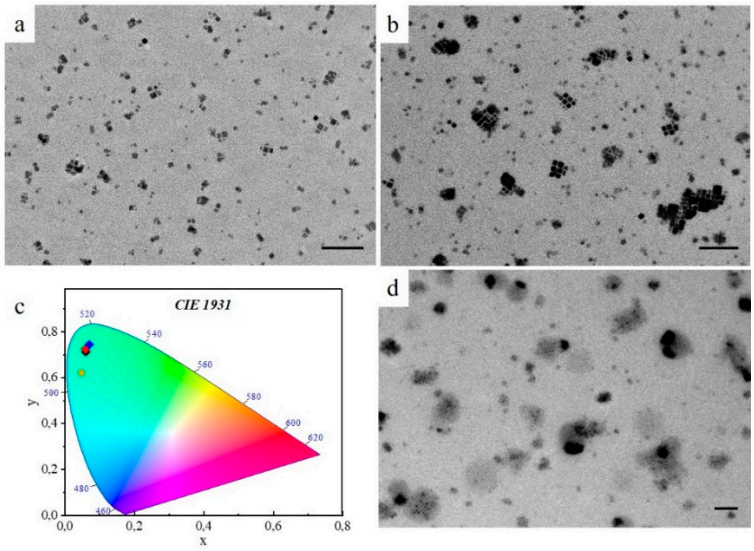
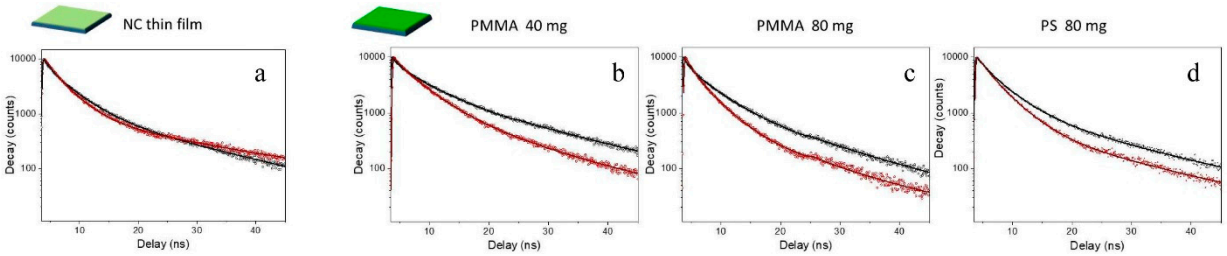


Figure S3. (a, b, d) TEM (scale bar 100 nm) micrographs of spin-coated blend of $CsPbBr_3$ NCs and polymethyl methacrylate (PMMA) 40mg (a), PMMA 80 mg (b) and polystyrene (PS) 80 mg and (c). Color point position in the CIE 1931 diagram of free-standing films composed by $CsPbBr_3$ (0.04 mmol) and PMMA 40 mg, 80 mg, 140 mg (black, red and blue symbol, respectively) compared to that of $CsPbBr_3$ NC thin film (yellow circle symbol)



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	τ_1 (ns)		τ_2 (ns)		τ_3 (ns)		A1(%)		A2(%)		A3(%)	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
NC thin film	0.8±0.1	1.6±0.1	4.10±0.04	3.57±0.04	16.6±0.1	22.2±0.5	7.4±0.4	9.4±0.2	52.4±0.5	50.9±0.4	40.2±0.3	39.7±0.6
Polymer/$CsPbBr_3$ NCs Free standing film												
PMMA 40 mg	0.8±0.1	0.8±0.1	5.30±0.06	4.04±0.04	17.58±0.07	12.3±0.1	4.6±0.1	2.8±0.1	44.2±0.4	58.3±0.2	51.2±0.3	38.9±0.7
PMMA 80 mg	0.74±0.01	0.66±0.01	4.46±0.04	3.24±0.03	14.8±0.1	12.1±0.1	7.3±0.4	10.7±0.4	53.9±0.7	63.6±0.6	38.8±0.4	25.7±0.3
PS 80 mg	1.47±0.09	1.52±0.09	4.11±0.07	3.59±0.03	16.3±0.3	15.8±0.3	89.1±0.1	9.4±0.2	53.4±0.3	66.1±0.5	37.5±0.2	24.5±0.4

Figure S4. Time resolved photoluminescence decay of $CsPbBr_3$ NC thin spin coated film (a) and free-standing films (b-d) prepared with polymethyl methacrylate (PMMA 40 mg, b and 80 mg, c) or polystyrene (PS, d) before (black line) and after (red line) 280 hours of exposure to relative humidity RH%= 85%. The PL decay curves have been well-fitted with a triexponential function according to equation reported below, reducing the goodness of fit χR^2below to 1.2

$$A(t) = A_1 \exp\left(-\frac{t}{\tau_1}\right) + A_2 \exp\left(-\frac{t}{\tau_2}\right) + A_3 \exp\left(-\frac{t}{\tau_3}\right)$$

A, A_1, A_2, and A_3 are constants, t is time, and τ_1, τ_2, and τ_3 represent the three decay lifetimes components. The value of the fitting parameters, reported in panel e, allow to calculate the average lifetime (τ_{avg}) reported in Figure 2 and in the table in Figure 3, in the main manuscript, as follows:

$$\tau_{avg} = \frac{A_1\tau_1^2 + A_2\tau_2^2 + A_3\tau_3^2}{A_1\tau_1 + A_2\tau_2 + A_3\tau_3}$$