

# The Fabrication of Cesium Lead Bromide-Coated Cellulose Nanocomposites and Their Effect on the Detection of Nitrogen Gas

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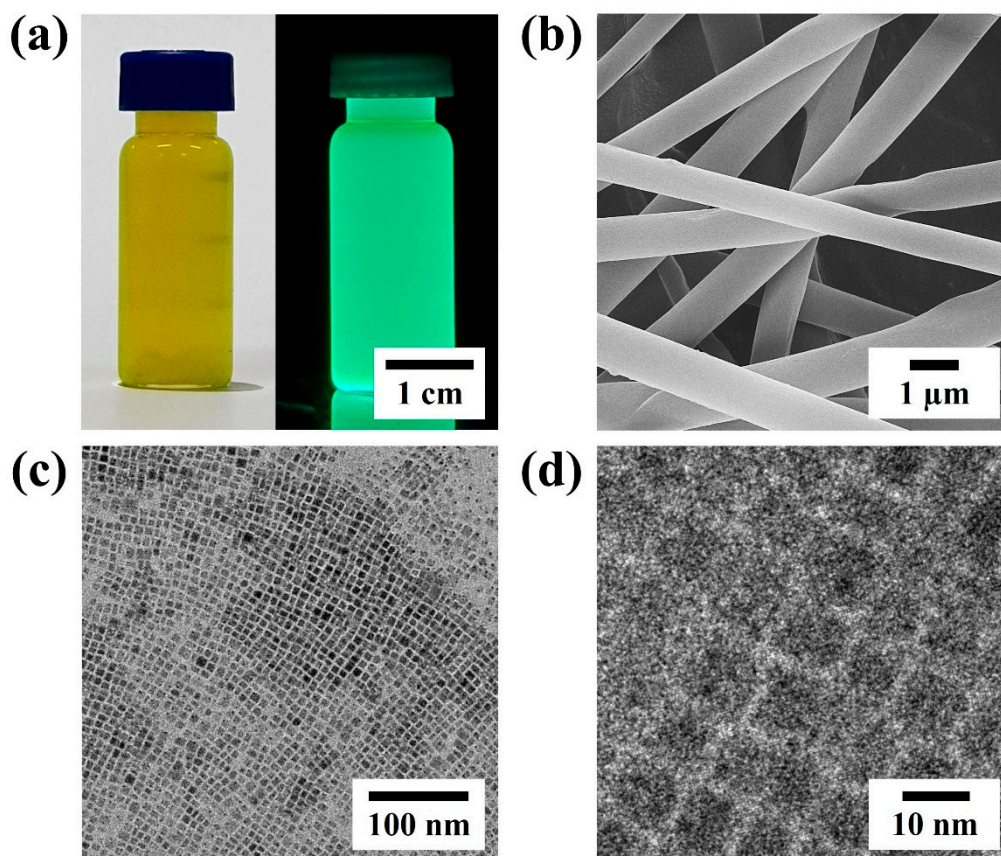
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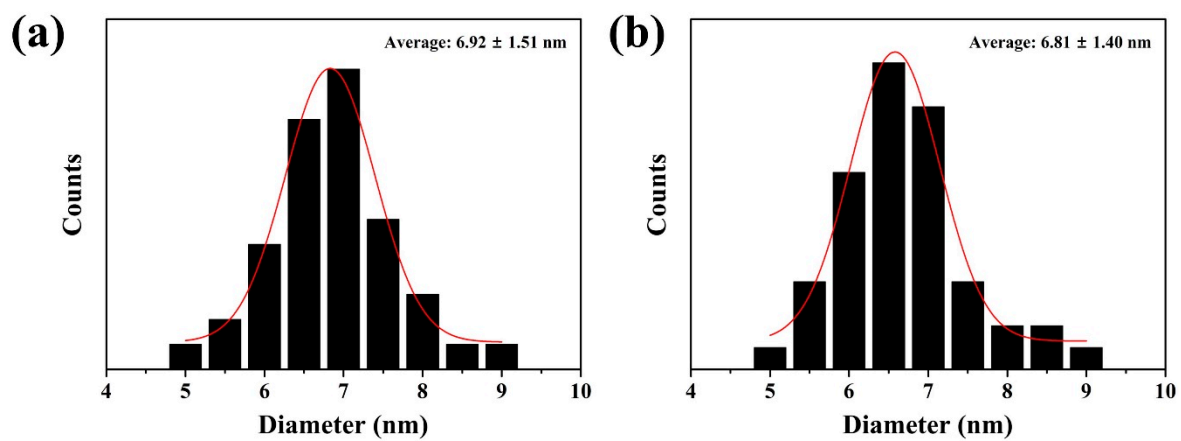
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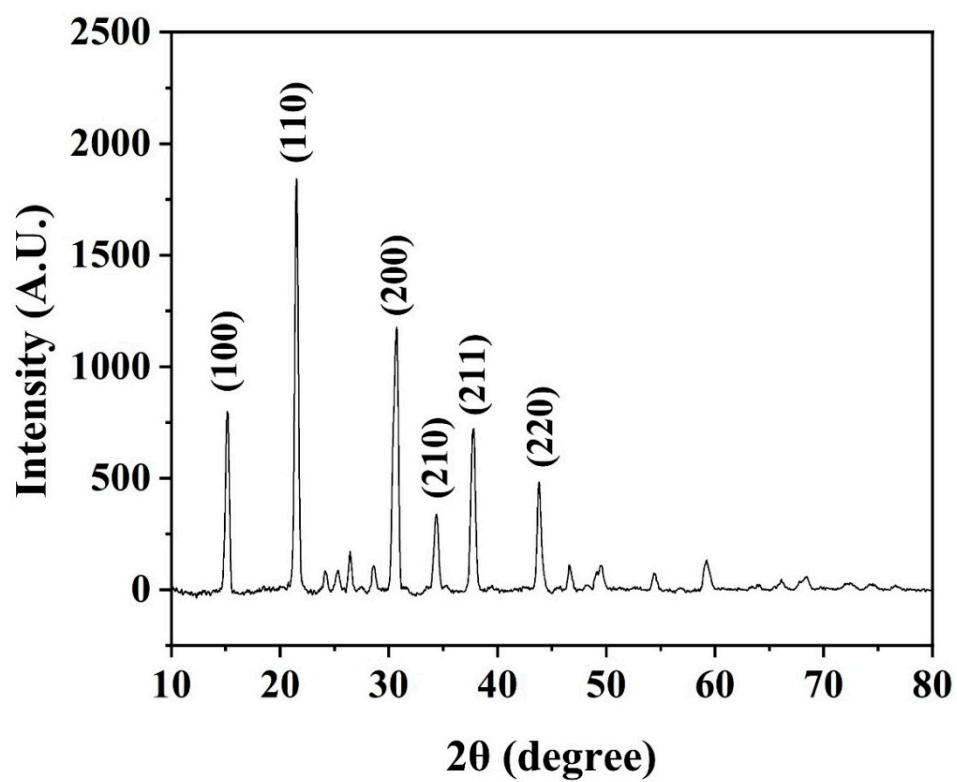
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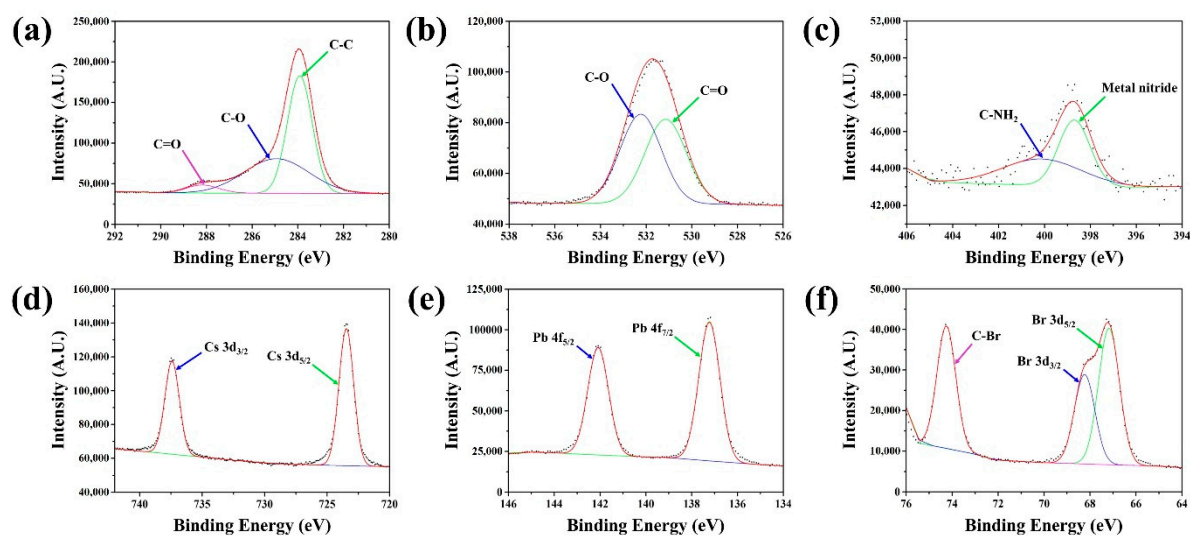
**Figure S1.** Morphological characterization; **(a)** CsPbBr<sub>3</sub> NCs under visible light and UV field, **(b)** scanning electron microscopy (SEM) image of CNFs, and transmission electron microscopy (TEM) image of CsPbBr<sub>3</sub> NCs at **(c)** low and **(d)** high magnification.



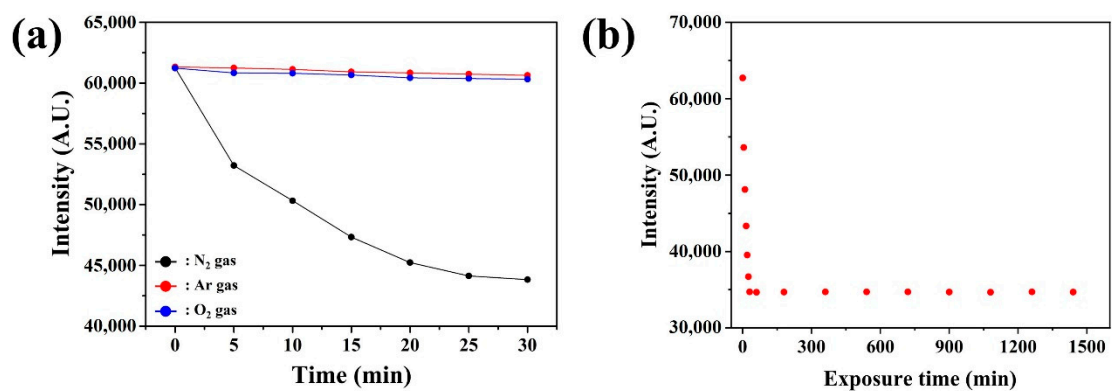
**Figure S2.** Size distribution graph of (a) CsPbBr<sub>3</sub> NCs and (b) NCs attached on the surface of CNFs.



**Figure S3.** X-ray diffraction (XRD) pattern of fabricated CsPbBr<sub>3</sub> NCs through hot injection method.



**Figure S4.** Narrow X-ray photoelectron spectroscopic (XPS) scan of (a) C 1s, (b) O 1s, (c) N 1s, (d) Cs 3d, (e) Pb 4f, and (f) Br 3d for CsPbBr<sub>3</sub> NFs.



**Figure S5.** (a) Selectivity of fabricated gas sensor with various gas at a concentration of 10 ppm, and (b) repeatability analysis of fabricated gas sensors under atmosphere after detection of nitrogen gas.

**Table S1.** Deconvolution of the XPS spectra.

Elemental composition		Binding energy (eV)
C 1s	C–C	283.93
	C–O	285.45
	C=O	288.22
O 1s	C=O	531.12
	C–O	532.22
N 1s	Metal nitride	398.78
	C–NH <sub>2</sub>	400.61
Cs 3d	Cs 3d <sub>5/2</sub>	723.43
	Cs 3d <sub>3/2</sub>	737.41
Pb 4f	Pb 4f <sub>7/2</sub>	137.22
	Pb 4f <sub>5/2</sub>	142.06
Br 3d	Br 3d <sub>5/2</sub>	67.19
	Br 3d <sub>3/2</sub>	68.10
	C–Br	74.24

**Table S2.** Comparison of gas sensors for detection of various types of nitrogen gas.

<b>Analytical technique</b>	<b>Detecting gas</b>	<b>LOD (<math>\mu\text{M}</math>)</b>	<b>Ref.</b>
Absorption spectra measurement	$\text{NH}_3$	58.72	[37]
Electrochemical measurement	$\text{NO}$	10.00	[38]
Amplified chemoresistor measurement	$\text{NO}_2$	0.22	[39]
CsPbBr <sub>3</sub> NFs-based photoluminescence measurement	$\text{N}_2$	28.57	This work