

Supporting Information for

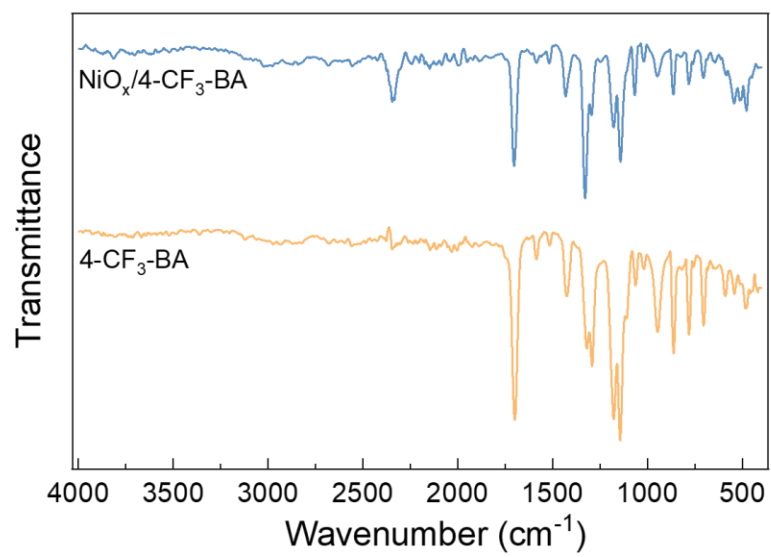
**Flexible Substrate-Compatible and Efficiency-Improved Quantum-Dot Light-Emitting Diodes with Reduced Annealing Temperature of NiO<sub>x</sub> Hole-Injecting Layer**

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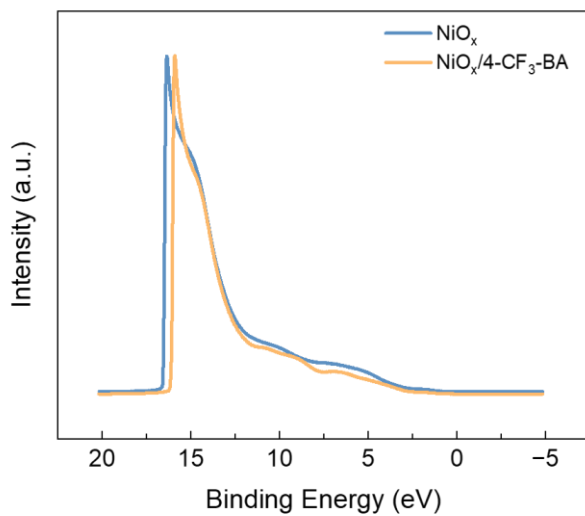
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<sup>+</sup> These authors contributed equally to this work.

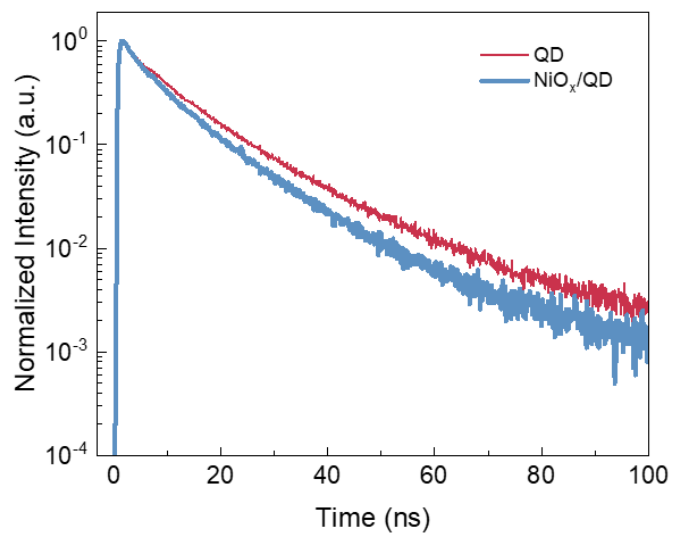
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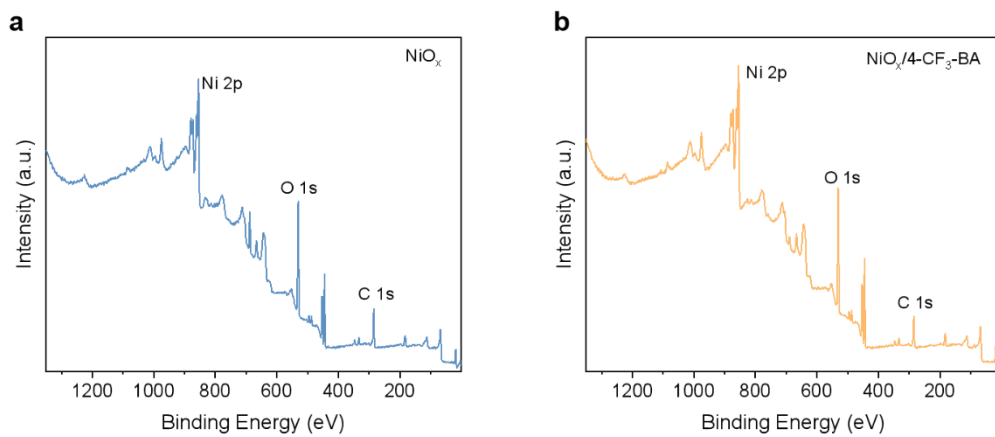
**Figure S1.** FTIR spectra of  $\text{NiO}_x$  with organic dipole molecule.



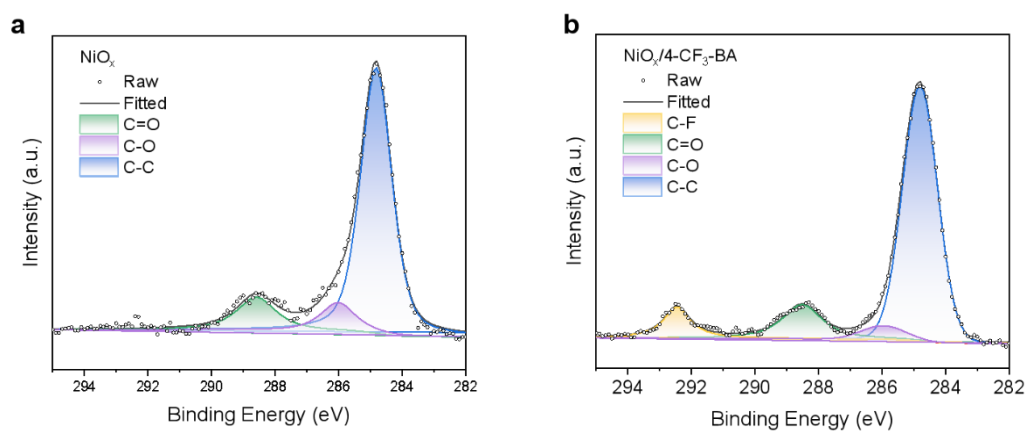
**Figure S2.** Full spectrum diagram of UPS.



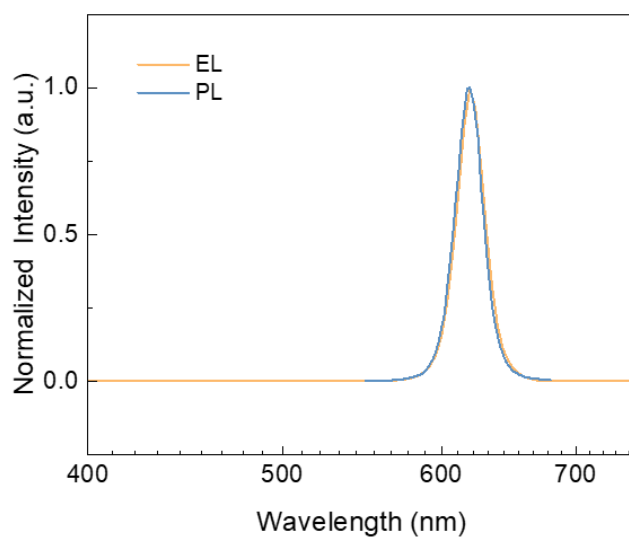
**Figure S3.** Time-resolved PL spectra of QDs coated on glass and NiO<sub>x</sub>.



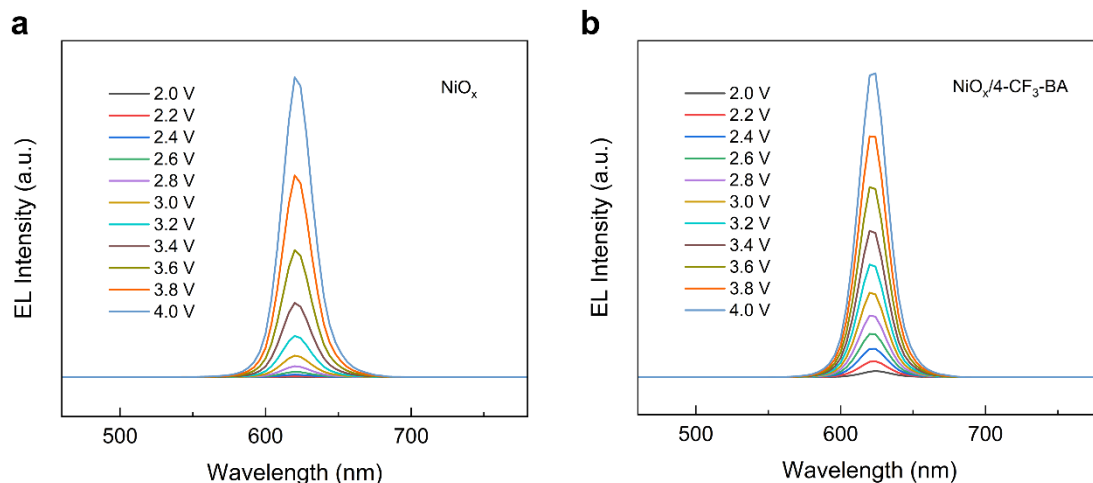
**Figure S4.** Full spectrum diagram of XPS.



**Figure S5.** C 1s core levels of NiO<sub>x</sub> films before and after modifications.



**Figure S6.** Normalized EL and PL spectra of QDs.



**Figure S7.** (a) EL spectra of the QLED with  $\text{NiO}_x$  as HIL under different driving voltages. (b) EL spectra of the QLED with  $\text{NiO}_x/4\text{-CF}_3\text{-BA}$  as HIL under different driving voltages.

**Table S1.** Fractional peak results of XPS.

Peak		Binding Energy (eV)	Peak Area Proportion (%)
Ni 2p ( $\text{NiO}_x$ )	Ni Satellite1	865.19	5.49
	Ni Satellite2	861.09	41.25
	$\text{Ni}^{3+}$	855.79	37.12
	$\text{Ni}^{2+}$	853.97	16.14
Ni 2p ( $\text{NiO}_x/4\text{-CF}_3\text{-BA}$ )	Ni Satellite1	865.19	4.88
	Ni Satellite2	861.32	42.10
	$\text{Ni}^{3+}$	855.89	39.60
	$\text{Ni}^{2+}$	854.08	13.42
O 1s ( $\text{NiO}_x$ )	$\text{NiO(OH)}$	531.83	32.53
	$\text{Ni(OH)}_2$	531.1	35.03
	$\text{NiO}$	529.59	32.44
O 1s ( $\text{NiO}_x/4\text{-CF}_3\text{-BA}$ )	$\text{NiO(OH)}$	531.8	33.64
	$\text{Ni(OH)}_2$	531.01	29.03
	$\text{NiO}$	529.57	37.34
C 1s ( $\text{NiO}_x$ )	$\text{C=O}$	288.58	13.79
	$\text{C-O}$	286.02	10.58
	$\text{C-C}$	284.82	75.63
C 1s ( $\text{NiO}_x/4\text{-CF}_3\text{-BA}$ )	$\text{C-F}$	292.46	9.8
	$\text{C=O}$	288.52	14.74
	$\text{C-O}$	285.96	4.63
	$\text{C-C}$	284.81	70.82