Supplementary Information (SI) for Journal of Materials Chemistry C.

Supporting Information

Synergistic Enhancement of Nonlinear Optical Limiting via In-Situ Confined Carbon Nanodots in Metal-Porphyrinic Framework Thin Film

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EXPERIMENTAL SECTION

DFT calculations:

All the calculations were performed using Gaussian 16[1]. The ground-state equilibrium geometries of CDs@PIZA-1 were fully optimized using B3LYP functional and 6-31g (d, p) basis sets for C, H, N, O and Lanl2DZ for Co with D3 dispersion correction of Grimme. In order to get a deeper understanding of the wave function, Multiwfn 3.8(dev) code[2] and VMD[3] software were used to analyze the electronic structures.

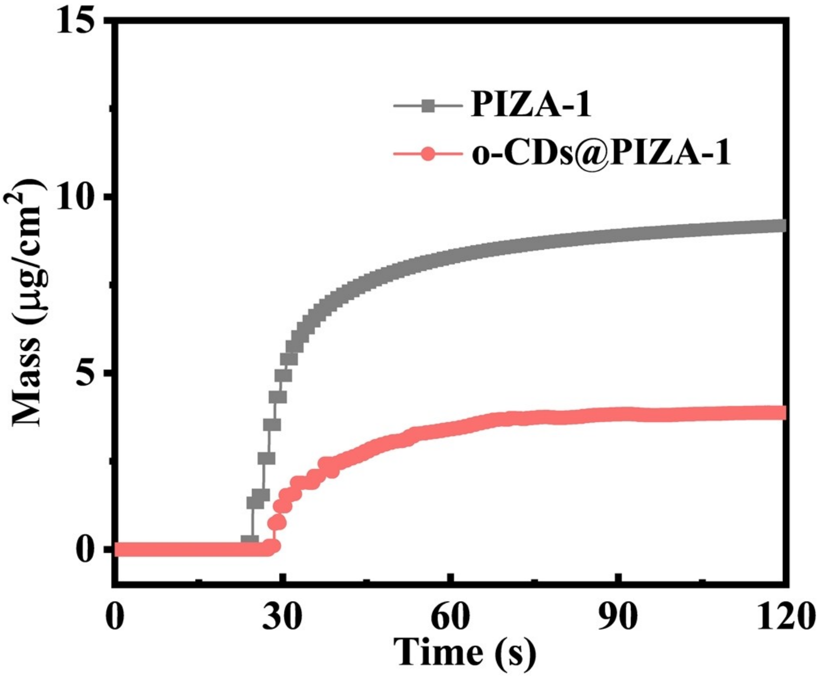

Figure S1. The mass uptakes of methanal for PIZA-1 and o-CDs@PIZA-1 thin film.

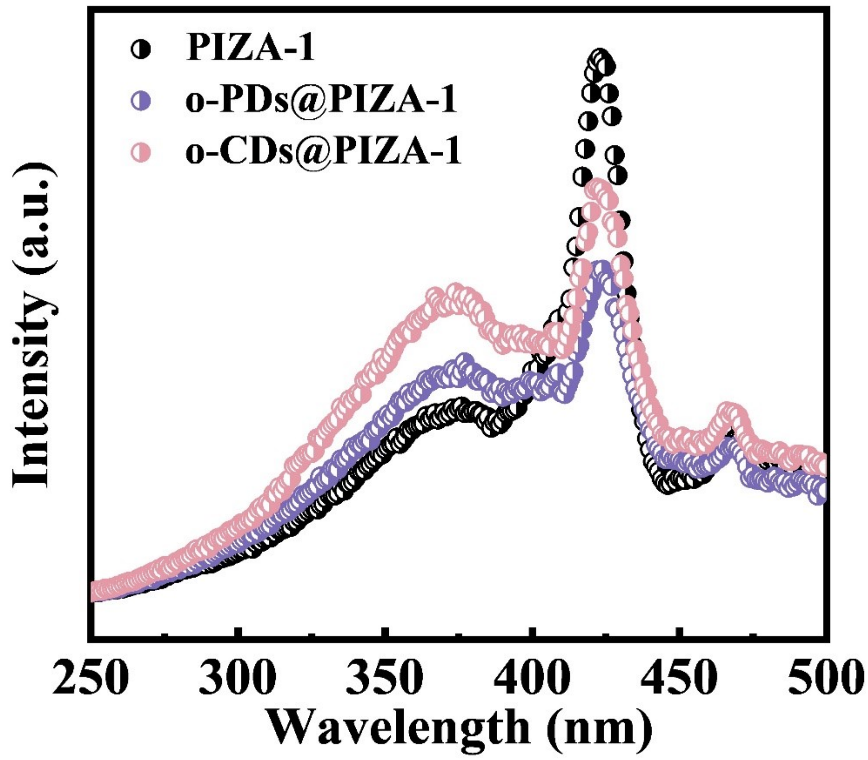

Figure S2. The PL excitation spectra of PIZA-1, o-PDs@PIZA-1 and o-CDs@PIZA-1 thin films.

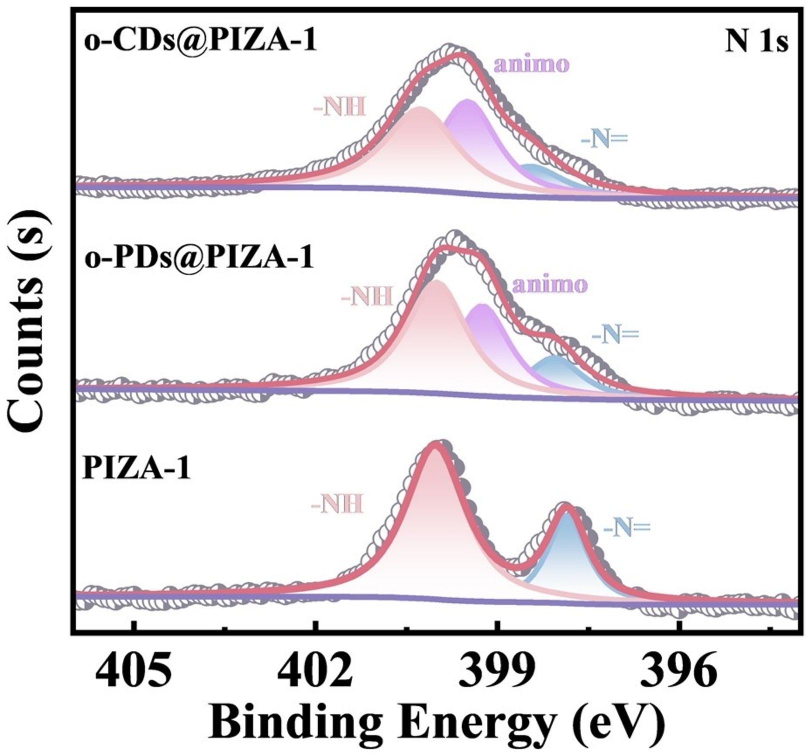

Figure S3. The N 1s XPS spectra of PIZA-1, o-PDs@PIZA-1 and o-CDs@PIZA-1 thin films.

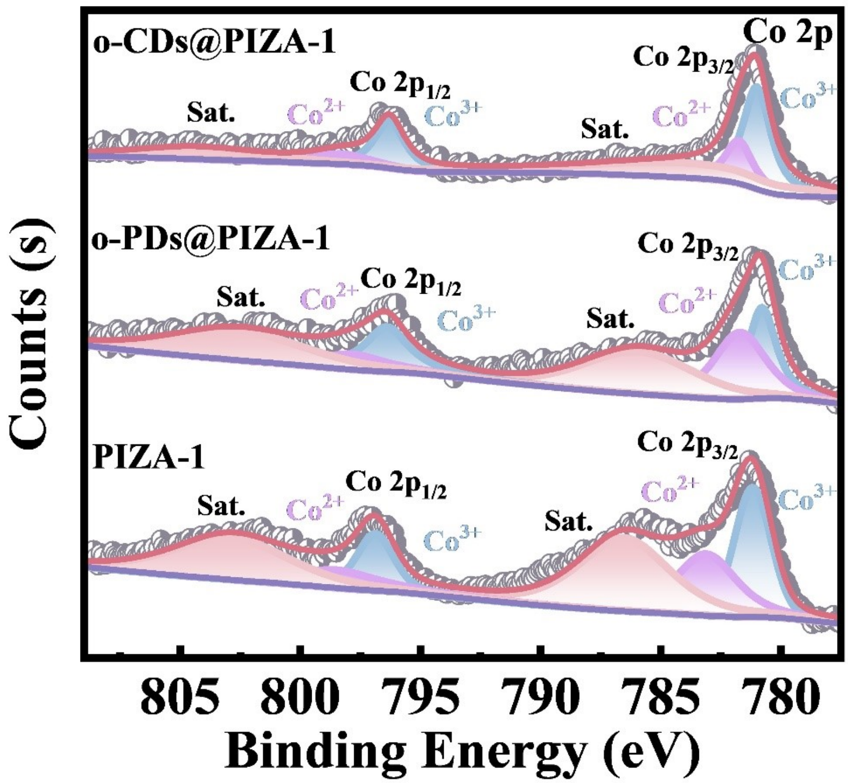

Figure S4. The Co 2p XPS spectra of PIZA-1, o-PDs@PIZA-1 and o-CDs@PIZA-1 thin films.

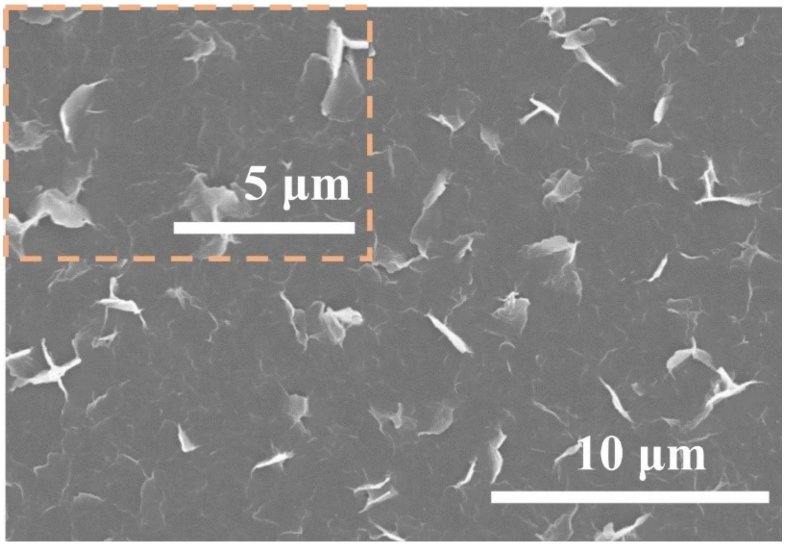

Figure S5. The SEM image of PIZA-1 thin film.

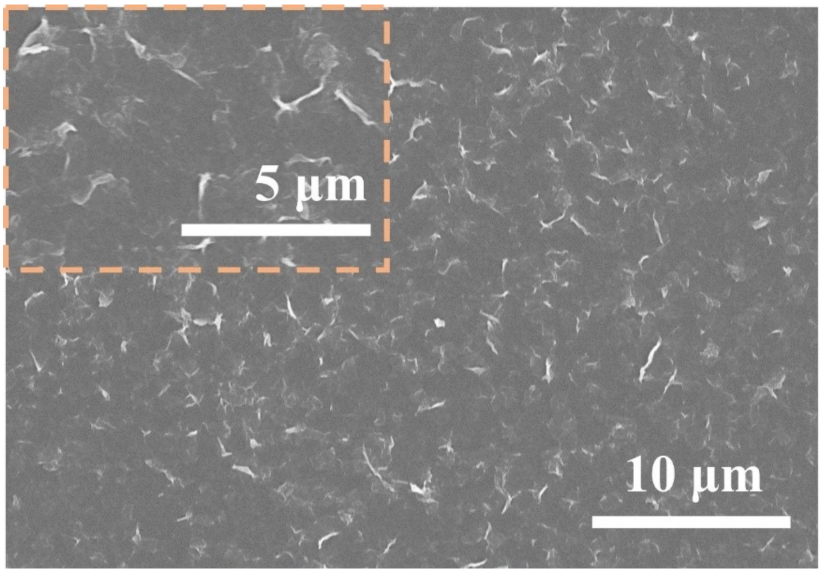

Figure S6. The SEM image of o-PDs@PIZA-1 thin film.

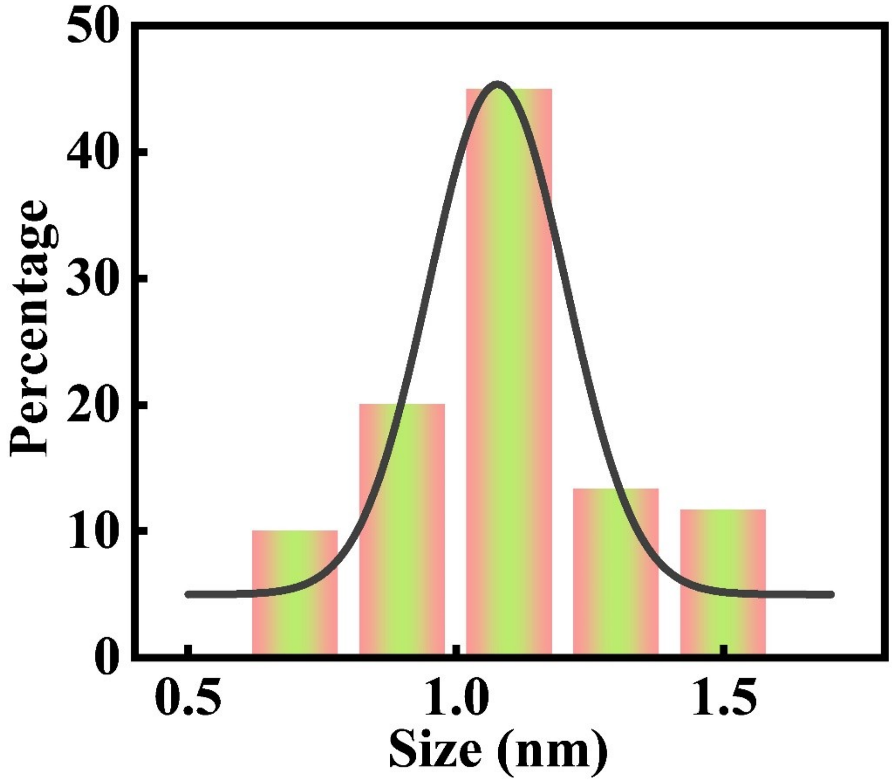

Figure S7. The size distribution of o-CDs.

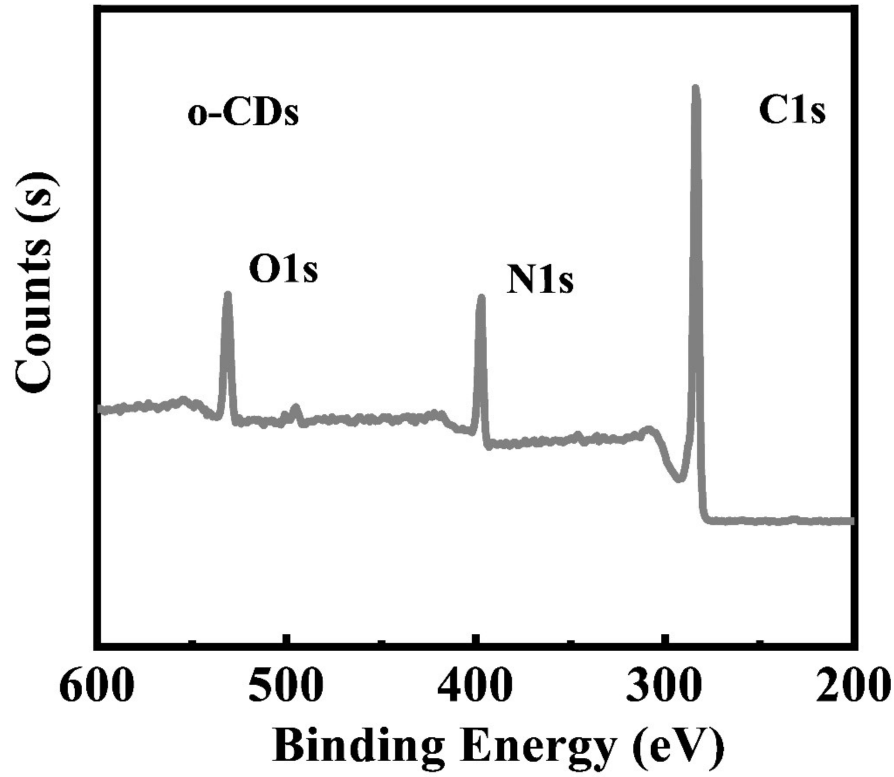

Figure S8. The survey XPS spectra of o-CDs.

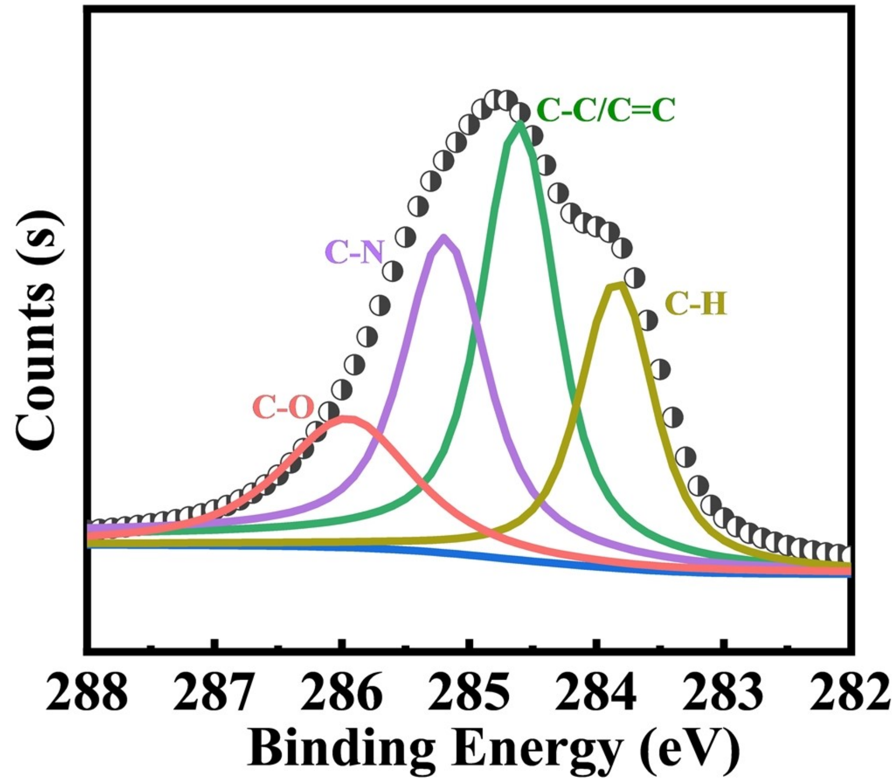

Figure S9. The high-resolution XPS spectra of o-CDs for C1s.

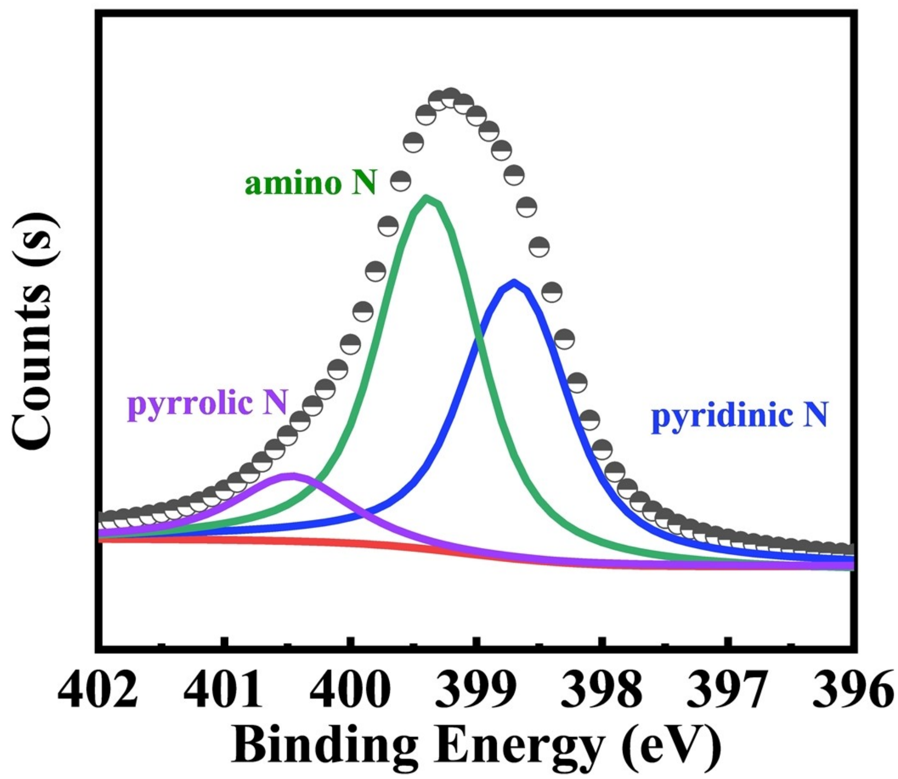

Figure S10. The high-resolution XPS spectra of o-CDs for N1s.

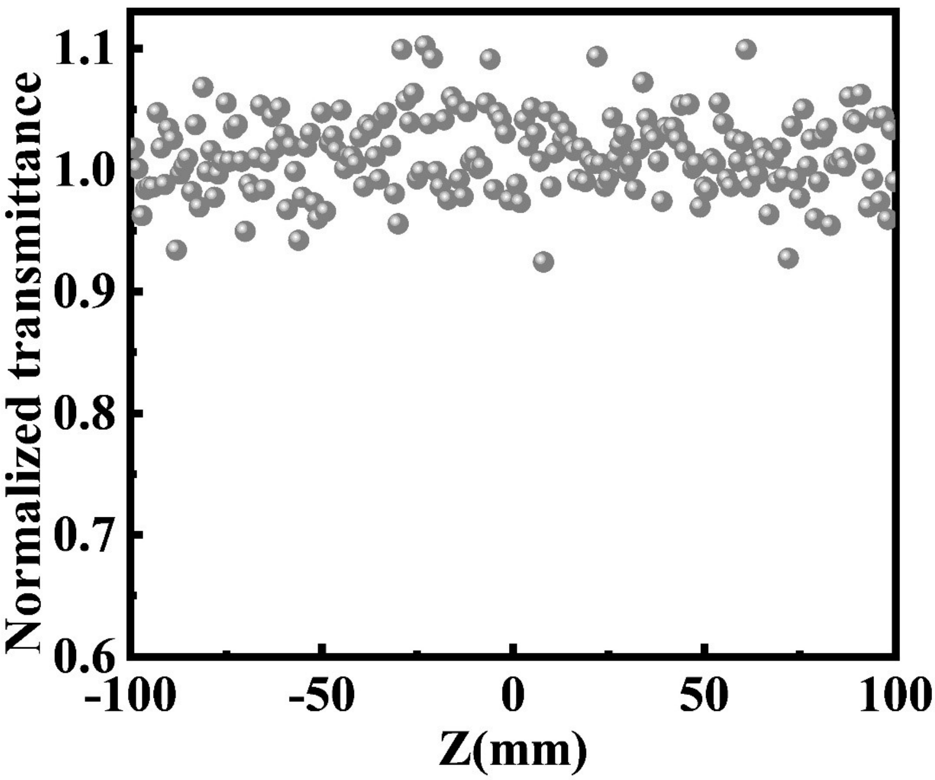

Figure S11. The open-aperture Z-scan plots of bare glass.

Figure S12. The open-aperture Z-scan plots of o-CDs@PIZA-1 thin film at different incident pulse energy.

Table S1. The comparison of the nonlinear absorption coefficients.

Samples	*β* (cm/GW)	References
o-CDs@PIZA-1 thin film	~3.1×10^5	In this work
PIZA-1 thin film	~2.16×10^5	In this work
MoS_2/PMMA	970.4	4
MoS_2-pvk	917.57	5
PFTP-RGO/PMMA	296.79	6
BP:C_{60}	241.73	7
PF-RGO	7.07	8
Por-TzTz-POF	1100	9
Por-COF-HH	1040	10
Por-COF-ZnNi	4170	
Por-COF-ZnCu	4470	
SWNT-TPP	105	11
Mn-TMPP CPs	9	12
Zn-TMPP CPs	46	
Mn-THPP CPs	9	
Zn-THPP CPs	18	
$(NH_2)_4$(4-TPP-Mn)	22	13
$[(TBA)_8\{(4\text{-TPP})(Mo_6O_{18})_4\}]$	88	
$[(TBA)_8\{(4\text{-TPP-Mn})(Mo_6O_{18})_4\}]$	98	
Co-THPP MOF	24-95	14
MQD-TPP/PMMA film	1059.17	15
TBIT-ZnPc	5.93	16

TBIT-InClPc	8.90	
TBTT-ZnPc	8.47	
TBTT-InClPc	12.10	
H_2TPPc	41	17
DNDs-H_2TPPc	58.5	
ZnTPPc	42.8	
DNDs-ZnTPPc	60.9	
Si(OH)$_2$TPPc	136	
DNDs-Si(OH)$_2$TPPc	125	
Copper porphyrin	132	18
Zinc porphyrin	366	
Pure grapheme	900	
[WS_4Cu_3(4,4'-pytz)$_3$]·[N(CN)$_2$]	46	19
Pt-Ni cluster/rGO	1.98	20

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