Supplementary Information

Enhancing the photothermal conversion of tetrathiafulvalene-based MOFs by redox doping and plasmon resonance

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Experimental Procedures

Synthesis of m-H₄TTFTB. m-H₄TTFTB was synthesized according to the previous method.¹

Synthesis of Dy-*m*-TTFTB: $[Dy_2(m$ -TTFTB)_{1.5}(HCOO)(C₃H₇ON)]•3(H₂O)•2(C₃H₇ON). The ligand *m*-H₄TTFTB (0.010 g, 0.015 mmol) and DyCl₃•6H₂O (0.010 g, 0.027 mmol) was dissolved in the solution of DMF (1 mL) and H₂O (0.5 mL), followed by the addition of CF₃COOH (0.17 mL) and chlorobenzene (2 mL). The mixture was heated to 140 °C for 48 h, then allowed to cool to room temperature. The red rod-like crystals (0.008 g) of Dy-*m*-TTFTB were obtained by filtration and washed with DMF and CH₃COCH₃ three times, respectively. Yield 48 % (based on *m*-H₄TTFTB). Calcd for C₆₁H₅₃N₃O₂₀S₆Dy₂ (Mr = 1665.47 g/mol): C, 43.99; H, 3.21; N, 2.52 %. Found: C, 42.76; H, 3.40; N, 2.36 %. FT-IR (KBr, cm⁻¹): 3627 w, 3375 w, 1699 w, 1657 w, 1589 m, 1549 s, 1428 s, 1394 vs, 1306 w, 1261 w, 1163 w, 1081 w, 1001 w, 922 w, 799 m, 761 s, 689 m, 669 m, 640 w, 626 w, 560 w, 443 m.

Synthesisofcompound $I_3^-@Dy-m-TTFTB$, $[Dy_2(m-TTFTB)_{1.5}(HCOO)(C_3H_7ON)]$ •0.51 (I_3^-) •(guest). The iodine doping of $I_3^-@Dy-m-TTFTB$ was undertaken using a diffusion technique. Crystals of Dy-m-TTFTB were soaked in a solutionof iodine in cyclohexane (0.1 M) at room temperature for 12 hours. Note that the color of thecrystals became deeper as the doping time was increased (Fig. 3b). The crystals obtained werewashed with cyclohexane. Selected IR data (KBr, cm⁻¹): 3396 w, 2922 w, 1700 w, 1652 s, 1589s, 1553 m, 1397 vs, 1305 m, 1260 w, 1165 m, 1081 m, 999 w, 921 w, 799 m, 759 s, 688 m, 668w, 639 w, 626 w, 562 w, 444 w.

Synthesis of compound Ag NPs@Dy-m-TTFTB, $Dy_2(m-TTFTB)_{1.5}(HCOO)$ (C_3H_7ON)]•0.36(Ag⁰)•0.36(NO₃⁻)•(guest). The Ag doped of Ag NPs@Dy-*m*-TTFTB was undertaken using a diffusion technique. Crystals of Dy-m-TTFTB were soaked in a solution of AgNO₃ in methanol (0.1 M) at room temperature for 12 hours. Note that the color of the crystals became deeper as the doping time was increased (Fig. 3c). The crystals obtained were washed with methanol. Selected IR data (KBr, cm⁻¹): 3383 w, 2115 w, 1588 s, 1549 m, 1431 w, 1393 vs, 1305 m, 1261 w, 1188 m, 1167 w, 1083 m, 996 w, 923 w, 799 m, 760 s, 688 m, 668 w, 638 w, 626 w, 563 w, 434 w. For photothermal conversion tests, the TTF radical concentration in Ag NPs@Dy-m-TTFTB was further increased by soaking in a solution of AgNO₃ in cyclohexane (0.1 M) at room temperature for 12 hours. The crystals obtained were washed with cyclohexane. The resulting material was formulated as $[Dy_2(m-TTFTB)_{1.5}(HCOO)(C_3H_7ON)]$ •0.36(Ag⁰)• 0.36(NO₃⁻)•0.1(I₃⁻)•(guest). Selected IR data (KBr, cm⁻¹): 3366 w, 1600 m, 1557 s, 1515 m, 1393 vs, 1306 m, 1260 m, 1187 m, 1260 m, 1187m, 1017 m, 923 w, 799 m, 759 s, 688 m, 668 w, 626 w, 567 w, 441 w.

Characterization. Elemental analyses for C, H, and N were performed on Perkin-Elmer 240C analyzer. FT-IR data were recorded on Vector27 Bruker Spectrophotometer with KBr pellets in the 4000 - 400 cm⁻¹ region. TGA data were obtained on a STA 449C thermal analysis system with a heating rate of 10 °C min⁻¹ under N₂ atmosphere. The PXRD were collected with a scan speed of 0.1 s deg⁻¹ on a Bruker Advance D8 (40 kV, 40 mA) diffractometer with Cu radiation $(\lambda = 1.54056 \text{ Å})$ at room temperature. Calculated PXRD patterns were generated using Mercury 3.0. Electron paramagnetic resonance (EPR) spectra were obtained by using a Bruker EMX-10/12 X-band variable-temperature apparatus at 110 K. The SEM images were recorded on Hitachi S-3400N II and with EX-250 energy-dispersive X-ray micro analyzer. Transmission electron microscopy (TEM) and high-resolution TEM (HRTEM) images were acquired on a JEOL JEM 2100 microscope (200 kV). The samples were prepared by casting powder sample dispersions in ethanol on carbon-coated copper grids. Precise elemental concentrations of Ag, and Zr were determined by inductively coupled plasma atomic emission spectroscopy (ICP-AES) on an Optima 5300DV plasma ion spectrum mass spectrometer, for which the samples were prepared by dissolving NPs in H_2O_2/HNO_3 (1:1, v/v) with controlled concentrations. The CO₂ adsorption isotherms were measured at 195 K using a Micrometritics ASAP 2020 system. X-ray photoelectron spectroscopy (XPS) was recorded on a PHI 5000 VersaProbe X-ray photoelectron spectrometer using standard and monochromatic Al K α radiation. The binding energies from the spectra were calibrated against the C 1s peak located at 284.6 eV.

Solid state cyclic voltammetry. Solid state cyclic voltammetry measurements were performed in LiBF₄/CH₃CN as electrolyte using a CORREST 4-channel electrochemical workstation and a three-electrode system. The CVs were recorded using a glassy carbon working electrode (3.0 mm diameter), a platinum wire auxiliary electrode and an Ag/AgCl reference electrode. The sample was mounted on the glassy carbon working electrode by dipping the electrode into a paste made of the powder sample in ethanol. Ferrocene was measured as a standard. All potentials are reported in milli-Volts (mV) versus the Fc/Fc^+ couple.

Solid-state UV-Vis-NIR spectra. Solution-state UV-vis spectra were measured on a UV-3100 spectrophotometer. BaSO₄ was used for the baseline. Spectra are reported as the Kubelka-Munk transform, where $F(R) = (1-R)^2/2R$ (*R* is the diffuse reflectance of the sample as compared to BaSO₄).

Near-infrared Photothermal conversion. ~10 mg samples were pressed into thin slices with a diameter of 4 mm and then seted aside in a quartz petri dish. And then the film of Co-MOF was spread on a quartz slide at a distance of 8 cm from the 808 nm laser (Hi-Tech Optoelectronics Co., Ltd, Beijing, China). The power density of laser was adjusted between 0.1 and 07 W cm⁻². The infrared camera (Fotric 255 Pro Thermal Imaging Camera) was used to capture the infrared videos of the MOF sample when the illumination was on/off. The infrared photos and real-time temperatures for the MOF sample were extracted from the video by AnalyzIR software. Photothermal conversion of the blank quartz glass under 0.5 W cm⁻² 808 nm laser irradiation shows nearly no temperature change in 60 seconds. In the heating/cooling cycle experiments, there are thirty seconds for each cycle.

Conductivity test. The conductivity of the samples was obtained from Keithley 2400 source meter on CRX-4K High Performance Closed Cycle Refrigerator-based Probe Station at room temperature. The crystals were connected by the conductive carbon adhesive with the "two probe method". The conductivity σ could be expressed as, $\sigma = G \cdot L / A$, where L and G are the thickness, electrical conductance of the carystals, respectively, and A is the area of the conductive carbon adhesive. All of the current-voltage (I-V) measurements were performed in ambient conditions by sweeping the voltage from -1.5 V to 1.5 V.

Single Crystal Structure Studies. Single-crystal X-ray crystallographic studies: Data of Dym-TTFTB and partial oxidized Dy-m-TTFTB were collected on a Bruker D8 Venture diffractometer outfitted with a PHOTON-100 CMOS detector using monochromatic microfocus Mo- K_{α} radiation (λ = 0.71073 Å) that was operated at 50 kV and 40 mA at 153 K by chilled nitrogen flow controlled by a KRYOFLEX II low temperature attachment. Raw data collection and reduction were done using APEX3 software.² Adsorption corrections were applied using the SADABS routine. The structures were solved by direct methods and refined by full-matrix least-squares on F^2 using the SHELXTL software package.³ Non-hydrogen atoms were refined with anisotropic displacement parameters during the final cycles. Hydrogen atoms of $m-H_4TTFTB$ were calculated in ideal positions with isotropic displacement parameters. Free solvent molecules of dimethylformamide or water for Dy-m-TTFTB was highly disordered, and were unsuccessful to locate and refine the solvent peaks. The diffuse electron densities resulting from these residual solvent molecules were removed from the data set using the SQUEEZE routine of PLATON and refined further using the data generated.⁴ The SQUEEZE calculations in PLATON give a total solvent-accessible volume of 836.8 Å³ per unit cell, equivalent to 25.7% of the total crystal volume. The contents of the solvent region are not represented in the unit cell contents in crystal data. The final formula of Dy-m-TTFTB was calculated from the elemental analysis, TGA data. Crystallographic Data Centre (CCDC), under deposition number CCDC 1914386 and 2095766 (Dy-m-TTFTB and partial oxidized Dy-mTTFTB). This data can be obtained free of charge from the Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/data_request/cif. All relevant data supporting the findings of this study are available from the corresponding authors on request.

	Dy-m-TTFTB	partial oxidized Dy-m-TTFTB		
CCDC number	1914386	2095766		
Empirical formula	$C_{55}H_{32}NO_{15}S_6Dy_2\\$	$C_{55}H_{32}NO_{15}S_6Dy_2\\$		
Formula weight	1464.18	1464.18		
Temperature (K)	153	153		
Crystal system	Triclinic	Triclinic		
Wavelength (Å)	0.71073	0.71073		
Space group	<i>Pī</i> (No. 2)	<i>Pī</i> (No. 2)		
Unit cell dimensions (Å,°)				
a	15.6454(8)	15.535(2)		
b	15.6811(8)	15.691(2)		
С	16.7037(8)	16.802(3)		
α	105.784(1)	106.320(2)		
β	114.592(1)	114.686(2)		
γ	104.738(1)	104.098(2)		
Volume (Å ³)	3254.0(3)	3251.1(8)		
Z	2	2		
Calculated density (gcm-3)	1.495	1.496		
F(000)	1436	1434		
Absorption coefficient,	2.529	2.532		
No. of reflections	28734	14531		
No. of independent	14977	11280		
reflections θ (°)	2.1-27.6	1.5-27.4		
<i>R</i> _{int}	0.027	0.051		
$R_{l}, wR_{2}[I \ge 2\sigma(I)]$	0.0282/ 0.0655	0.0475/ 0.1449		
R_1 , wR_2 [all data]	0.0383/ 0.0694	0.0618/ 0.1564		
GOF	1.06	1.07		
Largest diff. peak and hole(eÅ ⁻³)	1.00 / -0.72	2.29/-2.38		

 Table S1. Crystal data and structure refinement parameters for Dy-m-TTFTB.

 $\label{eq:rescaled} [a]\,R1 = \Sigma ||F_o| - |F_c|| / \Sigma |F_o|, \, wR_2 = [\Sigma w (F_o{}^2 - F_c{}^2)^2 / \Sigma w (F_o{}^2)^2]^{1/2}.$

Dy(1)-O(1) ⁱ	2.307 (2)	Dy(2)-O(2) ^{iv}	2.294 (2)
Dy(1)-O(3) ⁱⁱ	2.304 (2)	Dy(2)-O(7)	2.250 (2)
Dy(1)-O(4)	2.283 (2)	Dy(2)-O(8) ^{vi}	2.324 (2)
Dy(1)-O(5) ⁱⁱⁱ	2.306 (2)	Dy(2)-O(11) ^{vii}	2.315 (2)
Dy(1)-O(6) ^{iv}	2.296 (2)	Dy(2)-O(12) ^{viii}	2.315 (2)
Dy(1)-O(9)	2.397 (2)	Dy(2)-O(13)	2.325 (2)
Dy(1)-O(15) ^v	2.457 (2)	Dy(2)-O(14)	2.396 (2)
O(1) ⁱ -Dy(1)-O(9)	72.64 (8)	$O(5)^{iii}$ -Dy(1)-O(1) ⁱ	139.18 (8)
O(1) ⁱ -Dy(1)-O(15) ^v	97.45 (8)	O(5) ⁱⁱⁱ -Dy(1)-O(9)	137.22 (8)
$O(3)^{ii}$ -Dy(1)-O(1) ⁱ	145.14 (8)	O(5) ⁱⁱⁱ -Dy(1)-O(15) ^v	75.36 (8)
O(3) ⁱⁱ -Dy(1)-O(5) ⁱⁱⁱ	74.65 (8)	$O(6)^{iv}$ -Dy(1)-O(1) ⁱ	83.20 (8)
O(3) ⁱⁱ -Dy(1)-O(9)	74.08 (8)	O(6) ^{iv} -Dy(1)-O(3) ⁱⁱ	80.05 (8)
O(3) ⁱⁱ -Dy(1)-O(15) ^v	81.75 (7)	O(6) ^{iv} -Dy(1)-O(5) ⁱⁱⁱ	123.81 (8)
O(4)-Dy(1)-O(1) ⁱ	81.85 (8)	O(6) ^{iv} -Dy(1)-O(9)	77.98 (8)
O(4)-Dy(1)-O(3) ⁱⁱ	122.96 (8)	O(6) ^{iv} -Dy(1)-O(15) ^v	148.08 (8)
O(4)-Dy(1)-O(5) ⁱⁱⁱ	76.64 (8)	O(9)-Dy(1)-O(15) ^v	71.91 (8)
O(4)-Dy(1)-O(6) ^{iv}	76.74 (8)	O(2) ^{iv} -Dy(2)-O(8) ^{vi}	130.59 (9)
O(4)-Dy(1)-O(9)	145.83 (8)	O(2) ^{iv} -Dy(2)-O(11) ^{vii}	151.44 (9)
O(4)-Dy(1)-O(15) ^v	135.10 (8)	O(2) ^{iv} -Dy(2)-O(12) ^{viii}	76.32 (8)
O(2) ^{iv} -Dy(2)-O(13)	77.42 (9)	O(8) ^{vi} -Dy(2)-O(13)	134.40 (9)
O(2) ^{iv} -Dy(2)-O(14)	76.45 (8)	O(8) ^{vi} -Dy(2)-O(14)	75.44 (7)
O(7)-Dy(2)-O(2) ^{iv}	88.06 (8)	O(11) ^{vii} -Dy(2)-O(14)	106.13 (8)
O(7)-Dy(2)-O(8) ^{vi}	125.94 (8)	O(12) ^{viii} -Dy(2)-O(8) ^{vi}	77.12 (8)
O(7)-Dy(2)-O(11) ^{vii}	80.58 (9)	O(12) ^{viii} -Dy(2)-O(11) ^{vii}	126.01 (8)
O(7)-Dy(2)-O(12)viii	78.66 (8)	O(12) ^{viii} -Dy(2)-O(13)	148.18 (9)
O(7)-Dy(2)-O(13)	82.81 (9)	O(12) ^{viii} -Dy(2)-O(14)	111.14 (8)
O(7)-Dy(2)-O(14)	158.57 (8)	O(13)-Dy(2)-O(11) ^{vii}	75.22 (9)
O(8)vi-Dy(2)-O(11)vii	76.09 (9)	O(13)-Dy(2)-O(14)	79.45 (8)

Table S2. Selected bond lengths (Å) and angles (°) of compound Dy-*m*-TTFTB.

Symmetry transformations used to generate equivalent atoms: (i) -x+2, -y+2, -z+2; (ii) -x+2, -y+1, -z+2; (iii) x+1, y, z+1; (iv) -x+1, -y+1, -z+1; (v) x+1, y+1, z+1; (vi) -x+1, -y, -z+1; (vii) x-1, y-1, z; (viii) -x+2, -y+1, -z+1.

Table S3 The shape parameters of Dy-*m*-TTFTB, I_3^{-} @Dy-*m*-TTFTB, and Ag NPs@Dy-*m*-TTFTB single crystals used for the calculating of electrical conductivity.

	Length (cm)	Width (cm)	Thickness (cm)	Cross- sectional area (cm ²)	Electrical conductance (G)	Electrical conductivity (S/cm)
Dy- <i>m</i> - TTFTB	0.040	0.007	0.007	4.90e-5	3.76e-10	3.10e-7
I ₃ ⁻ @Dy- <i>m</i> - TTFTB	0.09	0.004	0.004	3.60e-5	6.96e-10	9.93e-6
Ag NPs@Dy- <i>m</i> - TTFTB	0.040	0.004	0.004	4.90e-5	3.76e-10	2.70e-5

$$\sigma = G \frac{L}{A}$$

Electrical conductivity, σ , measures a material's ability to conduct electrical current. Measuring σ typically requires incorporating the material of interest into an electronic device, typically a resistor, and measuring the electrical conductance (G), length (L), and cross-sectional area (A) of the conduction channel.



Figure S1. The asymmetric unit of Dy-*m*-TTFTB. Displacement ellipsoids are drawn at the 50% probability level. Diffractions of some guest molecules of Dy-*m*-TTFTB were so weak as to not be identified in the difference Fourier map. Thus, they were calculated from the SQUEEZE results and combined with charge balance, elemental analysis and TGA data.



Figure S2. The coordination environment of *m*-TTFTB in Dy-*m*-TTFTB.



Figure S3. The coordination environments of Dy1 (a) and Dy2 (b).



Figure S4. (a) The two-dimensional framework of Dy-*m*-TTFTB linked by m-H₂TTFTB²⁻and one-dimensional Dy chains.



Figure S5. The CO₂ adsorption isotherms of Dy-*m*-TTFTB, I_3^- @Dy-*m*-TTFTB and Ag NPs@Dy-*m*-TTFTB at 195 K.



Figure S6. Observed X-ray powder diffraction patterns of Dy-*m*-TTFTB in different solvents for 24 hours. The slight shift of peak positions toward a low angle in dimethyl sulfoxide (DMSO) may suggest the expansion of crystal lattice.



Figure S7. The TGA plot of Dy-*m*-TTFTB under an N₂ atmosphere.

Thermogravimetric analysis of Dy-*m*-TTFTB was conducted from room temperature to 800 °C under N₂ atmosphere. The weight losses about 2.9% at 110 °C (calcd 3.2% for three H₂O), 13.6% at 310 °C (calcd 13.2% for two free DMF and one coordinated DMF) correspond to the release of three DMF. A plateau up to *ca*. 450 °C was followed, implying that Dy-*m*-TTFTB was stable up to 450 °C. After the plateau, Dy-*m*-TTFTB began to decompose.



Figure S8. (a) Normalized solid-state absorption spectra of m-H₄TTFTB and Dy-m-TTFTB. (b) Tauc plots of m-TTFTB and Dy-m-TTFTB. To compare the intrinsic electronic structure of the TTF moieties, the small adsorption peak at 760 nm (i.e. surface oxidized TTF⁺⁺ as impurities) was not considered in the bandgap calculation.



Figure S9. Solid state cyclic voltammograms of Dy-*m*-TTFTB performed over five consecutive cycles at different scan rates. The experiments were conducted in 0.1 M LiBF₄ in CH_3CN electrolyte.



Figure S10. The bond parameters of two crystallography independent TTF in the partial oxidized Dy-*m*-TTFTB.



Figure S11. The XPS survey spectra of Dy-*m*-TTFTB, I_3^- @Dy-*m*-TTFTB and Ag NPs@Dy-*m*-TTFTB.



Figure S12. The XPS spectra for I 3d with deconvolution of corresponding XPS peaks in I_3^- @Dy-*m*-TTFTB.



Figure S13. The element mapping of Dy-*m*-TTFTB and I_3^- @Dy-*m*-TTFTB crystals under SEM/EDX.



Figure S14. Energy dispersive spectroscopic data for I_3^- @Dy-*m*-TTFTB.



Figure S15. The element mapping of Ag NPs@Dy-*m*-TTFTB crystals under SEM/EDX.



Figure S16. Energy dispersive spectroscopic data for AgNPs@Dy-*m*-TTFTB.



Figure S17. Fourier transform infrared spectra of Dy-*m*-TTFTB, I_3^- @Dy-*m*-TTFTB and Ag NPs@Dy-*m*-TTFTB.



Figure S18. Experimental powder X-ray diffraction patterns for Ag NPs@Dy-*m*-TTFTB in different pH solutions.



Figure S19. Solid-state cyclic voltammograms of Ag NPs@Dy-*m*-TTFTB performed over 0.1 M LiBF₄ in CH₃CN electrolyte.



Figure S20. The IR thermal images of Dy-*m*-TTFTB MOF pallet under 0.1 W cm⁻² 808 nm laser which was then turned off.



Figure S21. The IR thermal images of Dy-*m*-TTFTB MOF pallet under 0.7 W cm⁻² 808 nm laser which was then turned off.



Figure S22. The IR thermal images of I_3^- @Dy-*m*-TTFTB MOF pallet under 0.1 W cm⁻² 808 nm laser which was then turned off.



Figure S23. The IR thermal images of I_3^- @Dy-*m*-TTFTB MOF pallet under 0.7 W cm⁻² 808 nm laser which was then turned off.



Figure S24. The TEM images of Ag NPs@Dy-TTFTB surface.



Figure S25. The photothermal conversion of the reported Dy-TTF-MOF, I_3 -@Dy-TTF-MOF, and Ag NPs@Dy-TTF-MOF.



Figure S26. PXRD patterns of four MOF samples powder after photothermal conversion tests.

Ref	Samples	Light source	Light Intensity	Temperature ranges	Added temperature
This work	Ag NPs@Dy-m- TTFTB	808 nm NIR laser	$0.7 \ {\rm W \ cm^{-2}}$	28.1-239.8	211.7 °C in 90 s
This work	Ag NPs@Dy-m- TTFTB	808 nm NIR laser	$0.7 \ {\rm W \ cm^{-2}}$	28.1-217.3	189.2 °C in 15 s
This work	I ₃ ⁻ @Dy- <i>m</i> - TTFTB	808 nm NIR laser	$0.7 \mathrm{~W~cm^{-2}}$	24.3-213 °C	188.7 °C in 90 s
This work	I ₃ ⁻ @Dy- <i>m</i> - TTFTB	808 nm NIR laser	0.7 W cm ⁻²	23.3-198.2 °C	174.9 °C in 15 s
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	CPO-27-Ni	UV-Vis irradiation (300-650 nm)	$0.5~\mathrm{W~cm^{-2}}$	26.0-166.7 °C	140.7 °C in 30 min
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	UiO-66-NH ₂	UV-Vis irradiation (300-650 nm)	$0.5~\mathrm{W~cm^{-2}}$	25.0-148.6 °C	123.6 °C in 30 min
<i>Chem. Commun.</i> 2020 , <i>56</i> , 7399-7402.	La-MV-MOF (film)	808 nm NIR laser	2 W cm ⁻²	23.1-145.0 °C	121.9 °C in 200 s
ACS Appl. Mater. Interfaces 2018. 10, 9555-9562	CPO-27-Zn	UV-Vis irradiation (300-650 nm)	$0.5~\mathrm{W~cm^{-2}}$	26.8-145.0 °C	118.2 °C in 30 min
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	Fe-MIL-NH ₂	UV-Vis irradiation (300-650 nm)	0.5 W cm ⁻²	27.6-143.4 °C	115.8 °C in 30
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	COF-TAPB- BTCA	UV-Vis irradiation (300-650 nm)	$0.5~\mathrm{W~cm^{-2}}$	26.6-141.4 °C	114.8 °C in 30
ACS Appl. Mater. Interfaces 2018. 10, 9555-9562	CPO-27-Mg	UV-Vis irradiation (300-650 nm)	$0.5 { m ~ cm^{-2}}$	24.1-135.8 °C	111.7 °C in 30 min
<i>Adv. Mater.</i> 2020 , <i>32</i> , e1908537.	CR-TPE-T	808 nm NIR laser	1.2 W cm ⁻²	22-129 °C	~107 °C in 30 s
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	ZIF-67	UV-Vis irradiation (300-650 nm)	$0.5~\mathrm{W~cm^{-2}}$	26.4-127.7 °C	101.3 °C in 30 min
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	HKUST-1	UV-Vis irradiation (300-650 nm)	$0.5 { m ~ cm^{-2}}$	25.0-124.7 °C	99.3 °C in 30
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	IR-MOF-3	UV-Vis irradiation (300-650 nm)	0.5 W cm ⁻²	26.4-118.6 °C	92.2 °C in 30
<i>J. Membrane Sci.</i> 2021 , <i>620</i> , 118888	SPS10	visible light	0.241 W cm ⁻²	-	92 °C in 4 min
<i>Chem. Commun.</i> 2020 , <i>56</i> , 7399-7402.	La-MV-MOF (crystals)	808 nm NIR laser	2 W cm ⁻²	23.1-111.1 °C	88 °C in 10 s
Chem. Eur. J. 2021, 27, 11050- 11055.	Co-MOF film	808 nm NIR laser	$0.5~\mathrm{W~cm^{-2}}$	22-156.5 °C	134.5 °C in 25 s
<i>Chem. Eur. J.</i> 2021 , <i>27</i> , 11050- 11055.	Co-MOF film	808 nm NIR laser	$0.7 { m ~ cm^{-2}}$	22-201 °C	179 °C in 10 s
Nanoscale, 2019 , 11, 11121– 11127	Supported PPF-3	Xe lamp	0.1 W cm ⁻²	20-89 °C	69 °C in 30 s
This work	Dy-m-TTFTB	808 nm NIR laser	$0.7 \ {\rm W \ cm^{-2}}$	22.8-90.1 °C	67.3 °C in 90 s
Ind. Eng. Chem. Res. 2019, 58, 3269–3281	S-PVDF-20	50 W ultraviolet lamp (400 nm)	-	25-92.3 °C	67.3 °C in 60 s
<i>Chem. Commun.</i> 2020 , <i>56</i> , 5223-5226.	Tri-PMDI-TTF	808 nm NIR laser	$0.7 \mathrm{~W~cm^{-2}}$	15-80 °C	65 °C in 200 s
<i>Chem. Commun.</i> , 2020 , 56, 52235226	Cocrystal Tri-PMDI-TTF	808 nm NIR laser	$0.7~\mathrm{W~cm^{-2}}$	17-80 °C	63 °C in 200 s
This work	Dy-m-TTFTB	808 nm NIR laser	0.7 W cm^{-2}	23.0-82.3 °C	59.3 °C in 15 s
Chem. Commun., 2019 , 55, 14315-14318	Fe-HCOF	808 nm NIR laser	1.8 W cm ⁻²	~19-74 °C	55 °C in 10 min
J. Am. Chem. Soc. 2019, 141, 14433–14442	Py-BPy2+- COF/PEG	808 nm NIR laser	1 W cm ⁻²	25-52 °C	55 °C in 5 min
J. Am. Chem. Soc. 2019, 141, 14433–14442	Py-BPy·+- COF/PEG	808 nm NIR laser	1 W cm ⁻²	25-75 °С	50 °C in 5 min
J. Membrane Sci. 2021, 620, 118888	Cu-TCPP	visible light	0.241 W cm ⁻²	-	51 °C in 4 min
ACS Nano 2019 , 13, 12006–12014	BDP NPs	808 nm NIR laser	0.32 W cm ⁻²	~27-74 °C	47 °C in 5 min
Chem. Commun., 2018 , 54, 4184	MIL-101-NH2- (Al)	UV-Vis irradiation (300-650 nm)	$0.5 {\rm ~W} {\rm ~cm}^{-2}$	~24-70 °C	46 °C in 30 min
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	ZIF-8	UV-Vis irradiation (300-650 nm)	$0.5 \mathrm{~W~cm^{-2}}$	26.1-70.5 °C	44.4 °C in 30 min
<i>Cryst. Growth Des.</i> 2021 , 21, 2, 729–734.	TCNQ@Ru-MOF	980 nm laser	-	26-65.1 °C	39.1 °C in 15 min
ACS Energy Lett. 2020, 5, 2698–2705	CTCC-S3	1 sun light	$0.1 {\rm ~W~cm^{-2}}$	21.1-60.1 °C	39 °C in 3min
Angew. Chem. 2018, 130, 4027- 4031.	DTC cocrystal	800 nm NIR laser	$0.7 \ {\rm W \ cm^{-2}}$	29-66 °C	37 °C in 100 s
<i>Adv. Funct. Mater.</i> 2020 , <i>30</i> , 1910301	FA-CNPs	808 nm NIR laser	0.7 W cm ⁻²	23.6-60 °C	36.4 °C in 5min
Angew. Chem. Int. Ed. 2021, 60, 4789–4795	Dy-2D	1 sun light	0.1 W cm ⁻²	29.2-63.9 °C	34.7 °C in 4

Table S4 The photothermal properties in this work compared with previous results of solid materials in the literature.

Nat. Commun. 2019, 10, 3368.	Au@CCOF- CuTPP	300Wxenon lamp $\lambda >$ 400 nm	2.5 W cm ⁻²	-	31.9 °C in 19.5 min
ACS Appl. Mater. Interfaces 2018, 10, 9555-9562	UiO-66	UV-Vis irradiation (300-650 nm)	0.5 W cm ⁻²	25.5-57.3 °С	31.8 °C in 30 min
Angew. Chem. Int. Ed. 2020, 59, 20371–20375	CS-3	1 sun light	$0.1~\mathrm{W~cm^{-2}}$	25-56.1 °C	31.1 °C in120 s
Adv. Mater. 2019, 31, 1808249.	MHS (Cu-CAT-1 MOF)	1 sun light	$0.1~\mathrm{W~cm^{-2}}$	~25-55.9 °C	30.9 °C in 40 s
Adv. Mater. 2019, 31, 1808249.	Cu-CAT-1 MOF	1 sun light	0.1 W cm ⁻²	~25-53.2 °C	28.2 °C in 40 s
<i>Cryst. Growth Des.</i> 2021 , <i>21</i> , 2, 729–734.	Ru-MOF	980 nm laser	-	26-51.7 °C	25.7 °C in 15 min
Nat. Commun. 2019, 10, 3368.	CCOF-CuTPP	$\frac{300 \text{Wxenon lamp}}{\lambda > 400 \text{ nm}}$	$2.5 \mathrm{~W~cm^{-2}}$	-	25.4 °C in 17 min
Nat. Commun. 2019, 10, 3368.	Pd@CCOF- CuTPP	$\frac{300 \text{Wxenon lamp}}{\lambda > 400 \text{ nm}}$	$2.5 \mathrm{~W~cm^{-2}}$	-	25.3 °C in 18 min
J. Am. Chem. Soc. 2020, 142, 12574–12578	(R)-CuTAPBN- COF	visible light $\lambda = 420$ nm	$2.5 \mathrm{~W~cm^{-2}}$	25-50 °C	25 °C in 18min
Inorg. Chem. 2019, 58, 6601- 6608.	Ag-2D-CPs	800 nm NIR diode laser	$0.5~\mathrm{W~cm^{-2}}$	-	24.5 °C in 3 min
J. Membrane Sci. 2021, 620, 118888	SPS0	visible light	0.241 W cm ⁻²	-	24.2 °C in 10 min
Small 2019, 15, 1900354.	HPCM-4	1 sun light	$0.1~\mathrm{W~cm^{-2}}$	~24-41.2 °C	17.8 °C in 60 min
Adv. Mater. 2019, 31, 1808249.	Cu(OH) ₂ NWs on Cu	1 sun light	$0.1 \ {\rm W \ cm^{-2}}$	~25-40.7 °C	15.7 °C in 40 s
Small 2019, 15, 1900354.	SWCNT	1 sun light	0.1 W cm^{-2}	~24-35.9 °C	11.9 °C in 60 min
Adv. Mater. 2019, 31, 1808249.	Cu mesh	1 sun light	0.1 W cm ⁻²	~25-30.3 °C	5.3 °C in 40 s

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