Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Scherrer equation for spherically-shaped particles:

(S1)

$$D\ (nm) = \frac{0.89 \cdot \lambda}{\Delta 2\theta \cdot \cos(\theta)}$$

Where λ - X-ray source wavelength. nm

Δ2θ - peak width at half its height. °

Table S1

Parameters of the Mössbauer spectra for the samples.

Temperature. K		77.7±0.3						296±3						D	δ in Fe_3O_4	Compound
Sample	№	*δ	ε (Δ=2ε)	Γ_{exp}	H_{eff}	S	α	*δ	ε (Δ=2ε)	Γ_{exp}	H_{eff}	S	α			
		mm/s			kOe	%		mm/s			kOe	%		nm		
MOF**	1	0.52±0.01	(0.73±0.06)	0.54±0.01		80±20		0.41±0.01	(0.7±0.1)	0.62±0.01		80±30				
	2	0.53±0.01	(0.44±0.02)	0.30±0.07		20±20		0.41±0.01	(0.45±0.05)	0.4±0.2		20±30				
Fe_3O_4-MOF	1	0.51±0.01	0.07±0.01	0.23±0.04	529.4±0.7	28±8	7.3±0.1	0.27±0.01	0.01±0.01	0.47±0.01	485.3±0.3	63±7	3.66±0.03	2.01±0.01	0.317±0.008	$Fe_{2.683}O_4$
	2	0.52±0.02	-0.11±0.03	0.39±0.02	525.5±0.6	34±6		0.47±0.02	-0.04±0.01	0.41±0.04	484.4±0.6	24±7				
	3	0.30±0.01	0.03±0.01	0.38±0.02	522.0±0.8	37±5		0.28±0.02	-0.03±0.02	0.76±0.08	172±2	5.9±0.3				
	4	0.40±0.04	(0.65±0.01)	0.57±0.01		1.3±0.1		0.33±0.01	(0.65±0.01)	0.56±0.01		6.8±0.1				
Fe_3O_4-AA-MOF	1	0.61±0.03	0.01±0.01	0.32±0.06	518±2	15±5	2.0±0.5	0.33±0.04	-0.02±0.03	0.8±0.1	470±10	52±1	0.5±0.2	3.5±0.4	0.290±0.008	$Fe_{2.710}O_4$
	2	0.37±0.02	-0.01±0.01	0.39±0.04	513±1	31±6										
	3	0.49±0.01	(0.91±0.06)	0.57±0.02		42±7		0.37±0.01	(1.03±0.08)	0.53±0.04		25±7				
	4	0.51±0.01	(0.55±0.03)	0.35±0.06		11±7		0.39±0.01	(0.62±0.04)	0.43±0.03		23±7				

*δ — the isomeric shift. Δ — the quadrupole splitting. Γ_{exp} — the linewidth. H_{eff} — the hyperfine magnetic field. S — the relative area of the subspectrum. α – the quotient of particle anisotropy energy to thermal energy. D - magnetic domain diameter.

** The hyperfine parameters for this sample were determined from the experimental spectrum obtained in a narrow speed range. The spectra in Figure MS1 (a.d) are for illustration purposes only.

Table S2. Concentrations of elements in the samples. at.%.

Sample / Element	MOF	Fe_3O_4-MOF	Fe_3O_4-AA-MOF
Iron (Fe)	5.8	18.7	6.4
Oxygen (O)	33.5	76.8	44.2
Carbon (C)	60.7	4.5	49.4

Table S3. parameters of spectra deconvolution of MOF. Fe_3O_4-MOF and Fe_3O_4-AA-MOF samples.

Sample	Bond	E_b. eV	FWHM. eV	Bond portion. at.%
MOF	Fe^{2+} ($2p_{3/2}$)	710.0	2.88	22.25
	Fe^{2+} ($2p_{1/2}$)	723.6	2.88	11.13
	Fe^{3+} ($2p_{3/2}$)	712.1	4.45	25.10
	Fe^{3+} ($2p_{1/2}$)	726.3	4.45	9.94
	Fe^{2+} sat ($2p_{3/2}$)	715.5	4.56	13.51
	Fe^{2+} sat ($2p_{1/2}$)	729.0	4.56	4.13
	C-C	284.6	1.94	71.91

	C-OH	286.2	1.94	2.46
	C=O	288.5	1.94	22.72
	pi-pi* satellite	291.2	1.94	2.90
	Fe-OOH	530.0	2.19	14.85
	Fe-O	531.2	2.19	21.93
	Fe-OH ads.	531.8	2.19	63.22
Fe_3O_4-MOF	Fe^{2+} ($2p_{3/2}$)	709.9	3.22	19.54
	Fe^{2+} ($2p_{1/2}$)	723.5	3.21	9.77
	Fe^{3+} ($2p_{3/2}$)	711.9	4.15	18.48
	Fe^{3+} ($2p_{1/2}$)	725.8	4.15	9.96
	Fe^{2+} sat ($2p_{3/2}$)	715.4	6.25	13.48
	Fe^{2+} sat ($2p_{1/2}$)	729.0	6.25	5.65
	Fe^{3+} sat ($2p_{3/2}$)	719.9	6.32	16.73
	Fe^{3+} sat ($2p_{1/2}$)	732.3	6.32	6.39
	C-C	284.6	1.94	71.91
	C-OH	286.2	1.94	2.46
	C=O	288.5	1.94	22.72
	O-C=O	293.1	2.82	5.84
	Fe-OOH	530.3	2.77	100.00
Fe_3O_4-AA-MOF	Fe^{2+} ($2p_{3/2}$)	710.6	3.22	32.98
	Fe^{2+} ($2p_{1/2}$)	724.2	3.22	13.07
	Fe^{3+} ($2p_{3/2}$)	712.9	4.01	16.52
	Fe^{3+} ($2p_{1/2}$)	726.2	4.01	7.78
	Fe^{2+} sat ($2p_{3/2}$)	716.2	8.05	12.69
	Fe^{2+} sat ($2p_{1/2}$)	730.2	4.08	1.8
	Fe^{3+} sat ($2p_{3/2}$)	720.9	8.05	12.1
	Fe^{3+} sat ($2p_{1/2}$)	733.2	4.08	3.07
	C-C	284.6	1.93	65.4
	C-OH	286.6	1.93	7.47
	C=O	288.6	1.93	22.98
	pi-pi* satellite	291.1	2.97	4.15
	Fe-OOH	530.4	2.13	41.49
	Fe-OH ads.	531.9	2.13	50.97
	-OH (ads. H_2O)	533.5	2.13	7.54

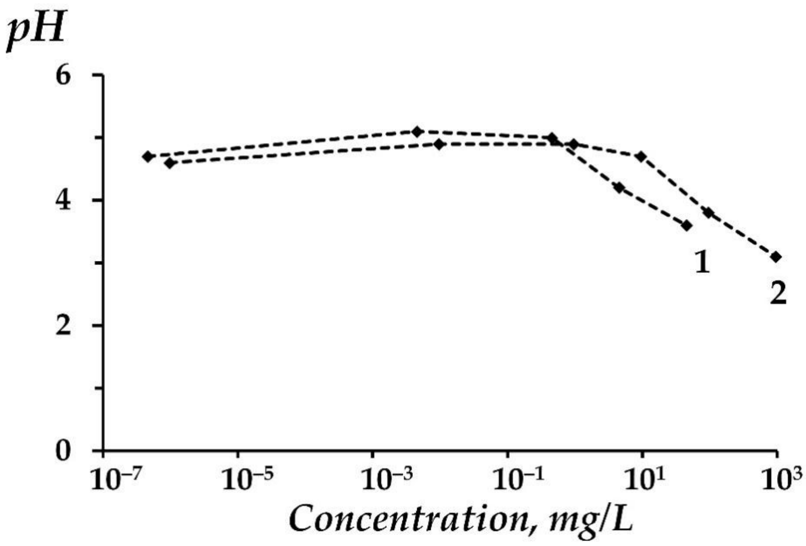

Figure S1. The pH of 3% NaCl solution exposed to nanocomposite of Fe_3O_4-MOF nanoparticles functionalized by ascorbic acid, Fe_3O_4-AA-MOF (1), and ascorbic acid (2). The pH of 3% NaCl solution (control) was 5. 0.

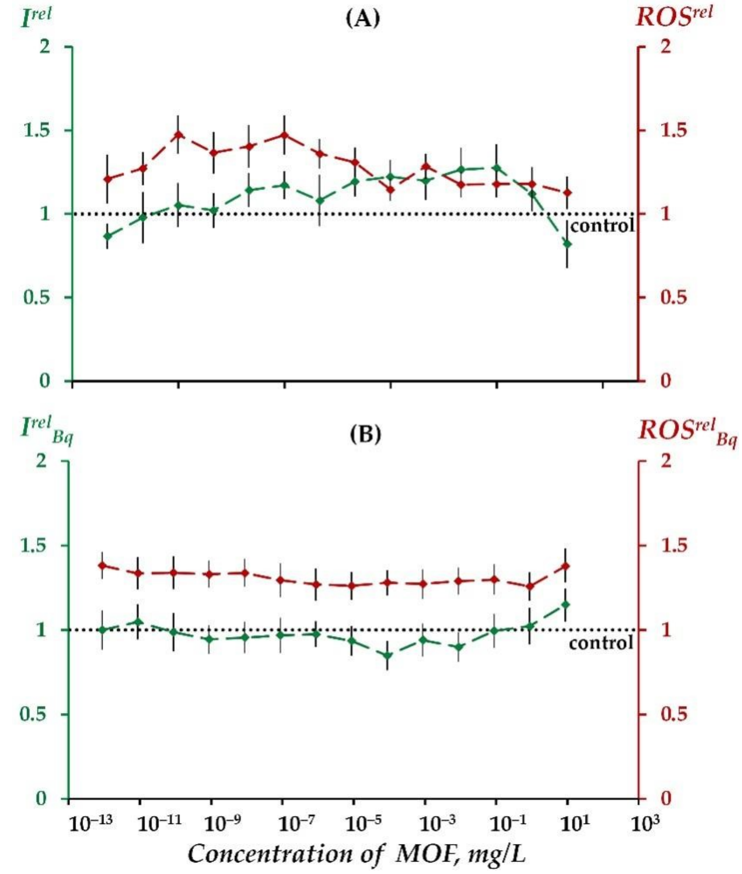

Figure S2. Bioluminescence intensity. I^{rel} (green curves), and ROS content. ROS^{rel} (red curves), in bacterial suspension vs. concentration of MOF (A) in the absence of 1.4-benzoquinone, (B) in the presence of 1.4-benzoquinone ($E_{C50}{}^{Bq}=10^{-7}$M). ROS content in the control bacterial suspensions was $\mathbf{3 \cdot 10^{-7}}$M (A) and $\mathbf{4 \cdot 10^{-7}}$M (B)