1 Supporting information for

2	Colorimetric method for glucose detection with enhanced signal intensity by using
3	ZnFe <sub>2</sub> O <sub>4</sub> -carbon nanotube-glucose oxidase composite material
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**Fig. S1** The TEM image of  $Fe_3O_4$  nanomaterial.



Fig. S2 The feasibility experiment. The A<sub>652nm</sub> of the reaction solutions in the
presence of TMB and (1) ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD and glucose, (2) ZnFe<sub>2</sub>O<sub>4</sub>, GOD and
glucose, (3) CNT-GOD and glucose, (4) ZnFe<sub>2</sub>O<sub>4</sub>-CNT and glucose, (5) ZnFe<sub>2</sub>O<sub>4</sub>CNT-GOD and (6) the A<sub>652nm</sub> of the reaction solution in the presence of TMB alone
(blank), respectively. The error bars represent the relative standard deviation of three
experimental results. The concentration of ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD, CNT-GOD,
ZnFe<sub>2</sub>O<sub>4</sub>-CNT and ZnFe<sub>2</sub>O<sub>4</sub> is 5 mg/mL, the concentrations of glucose, GOD and
TMB are 200 µM, 4 mg/mL and 10 mM, respectively.



Fig. S3 The  $A_{652nm}$  of the reaction solutions in the presence of 2 mM  $H_2O_2$ , 10 mM TMB and 5 mg/mL ZnFe<sub>2</sub>O<sub>4</sub>-CNT, ZnFe<sub>2</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub> or buffer alone (blank), respectively. Inset indicates the corresponding images of the reaction solution. The error bars represent the relative standard deviation of three experimental results.



**Fig. S4** The selectivity experiment and metal ion interference experiment. The absorption spectra of reaction solutions in the presence of 200  $\mu$ M different materials, (A). The absorption spectra of the reaction solutions in the presence of 200  $\mu$ M glucose and different metal ions (B), respectively. The concentration of different metal ions in these solutions is 100  $\mu$ M. The error bars represent the relative standard deviation of three experimental results. The reaction solutions contained 5 mg/mL ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD and 10 mM TMB, respectively.



**Fig. S5** The stability experiment. The  $A_{652nm}$  of the reaction solutions detected using the same batch of ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD materials for continuous 20 days. The error bars represent the relative standard deviation of three experimental results. The reaction solutions contained 5 mg/mL ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD, 200  $\mu$ M glucose and 10 mM TMB, respectively.



Fig. S6 The reusability of the composite materials. The  $A_{652nm}$  of the reaction 45 solutions after the ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD materials were used for different cycles (left 46 axis) and the relative activity of ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD materials after used for different 47 cycles (right axis), respectively. the catalytic activity of original ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD 48 materials was defined as 100 %. The ZnFe<sub>2</sub>O<sub>4</sub>-CNT-GOD were attracted at the 49 bottom of microplate wells under external magnetic field, and were washed with 50 NaAc-HAc buffer, then they were used again after adding 200 µM glucose and 10 51 mM TMB. The error bars represent the relative standard deviation of three 52 experimental results. The original reaction solutions contained 5 mg/mL ZnFe<sub>2</sub>O<sub>4</sub>-53 CNT-GOD, 200 µM glucose and 10 mM TMB, respectively. 54

Methods	Linear range	Limit of detection	Reference
Electrochemistry	2-40 µM	3 µM	1
Colorimetric assay	10-500 μM	4 µM	2
Colorimetric assay	1-100 µM	1 µM	3
Colorimetric assay	12.6-101 μM	9.8 µM	4
Fluorescent assay	80-420 μM	11 µM	5
Fluorescent assay	2.0-100 μM	0.42 µM	6
Photoluminescence	5-200 μM	1.32 μM	7
Colorimetric assay	0.8-250 μM	0.58 μΜ	This work

56	Table S1	The compari	ison of ou	method	with	previous	reports to	o detect	glucose.
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58	Table S	<b>52</b> Results	of the gluco	ose detection	on in	hum	ian se	erum	samples	by T	using	the
59	clinical	method,	commercial	detection	kit	and	the Z	ZnFe <sub>2</sub>	O <sub>4</sub> -CNT	-GO	D ba	ased

Sample	Clinical	Addad	Commercial	Pagovoru	This	Recovery	
(History of	result	(μM)	detection kit	(Q())	method	Recovery	
diabetes, age)	(µM)		(µM)	(%) <sup>a</sup>	(µM)	(%) <sup>a</sup>	
1	151.0	0.0	145.1±7.5		143.5±6.2		
(13 years, 67)	131.0	40.0	185.4±8.9	97.1	193.5±4.3	101.3	
2	68.0	0.0	62.4±8.1		71.4±4.9		
(3 years, 59)	08.0	40.0	113.4±7.7	105.0	106.7±3.8	98.8	
3	06.0	0.0	93.3±7.8		92.3±4.7		
(0.5 year, 63)	90.0	40.0	132.4±8.2	97.4	142.7±5.2	104.9	
4	72.0	0.0	78.6±6.3		72.3±4.6		
(2 years, 57)	75.0	40.0	109.3±5.9	96.7	116.7±6.2	103.3	
5	60.0	0.0	62.9±7.5		72.2±5.4		
(1 year, 68)	69.0	40.0	101.7±7.3	93.3	110.5±4.4	101.4	
6	59.0	0.0	52.7±6.9		54.7±5.1		
(normal, 32)	58.0	40.0	93.5±7.3	95.4	97.3±4.7	99.3	
7	(1.0	0.0	57.8±8.2		63.5±3.9		
(normal, 29)	01.0	40.0	97.5±8.1	96.5	105.7±3.7	104.7	
a C	Compared		with	clini	cal	results	

60 colorimetric method (*n*=3).

## 62 **References**

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