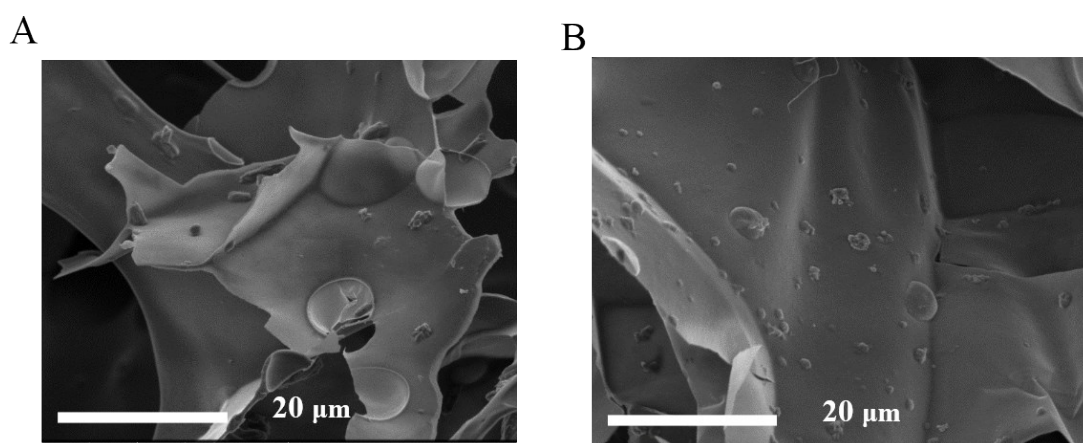


## Glow-type chemiluminescent hydrogels for point-of-care testing (POCT) of cholesterol

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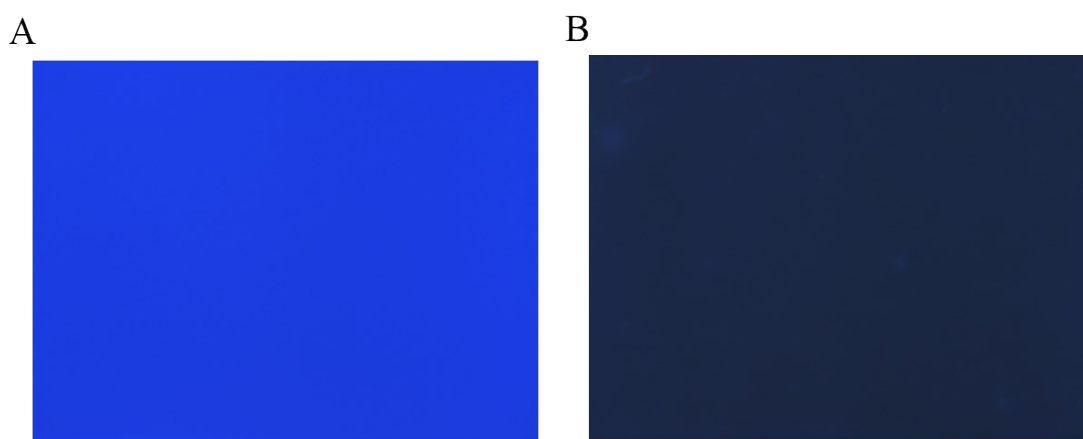
### Supporting information

#### SEM imaging



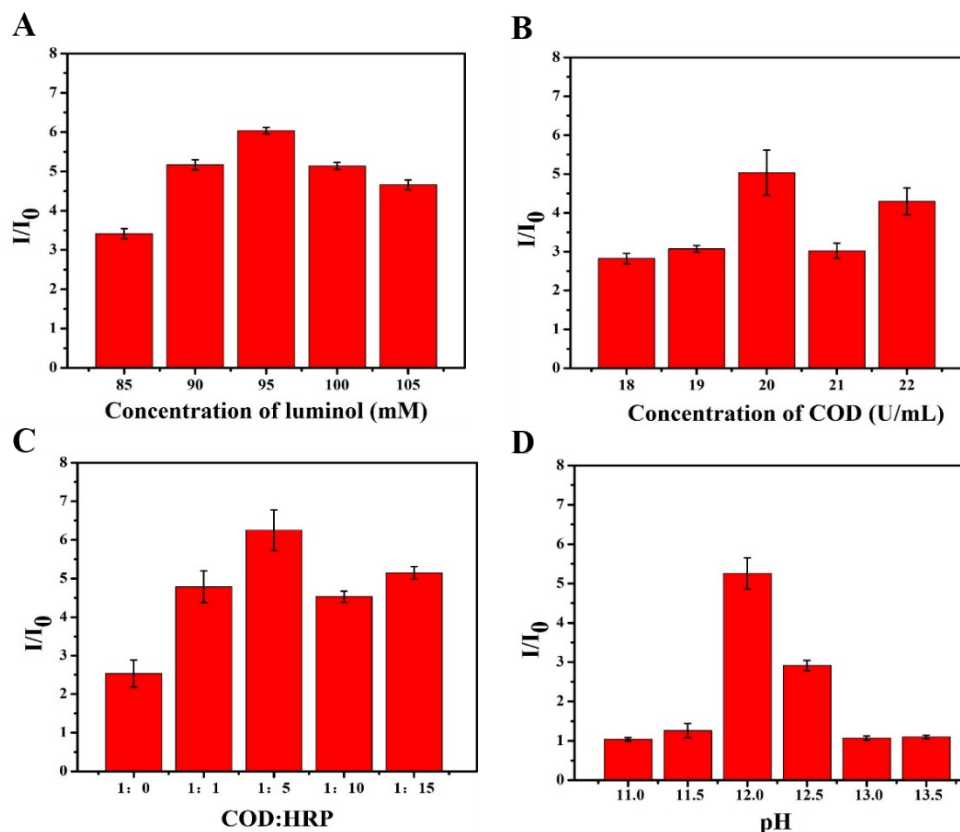
**Figure S1** SEM images of freeze-dried hydrogels in the absence (A) and presence (B) of enzyme.

#### Fluorescence imaging



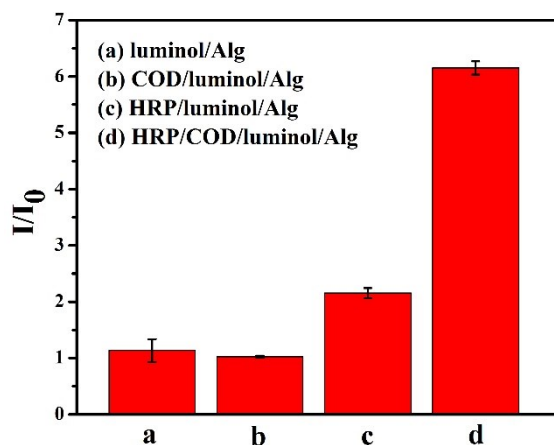
**Figure S2** Fluorescence images of hydrogels in the presence (A) and absence (B) of luminol.

## Optimization of reagent concentration



**Figure S3** (A) Optimization of luminol concentration. For HRP/COD/luminol/Alg hydrogels: 20 U/mL COD, COD: HRP=1: 5. (B) Optimization of pH of cholesterol solution. For HRP/COD/luminol/Alg hydrogels: 95 mM luminol, 20 U/mL COD, COD: HRP=1: 5. (C) Optimization of COD concentration. For HRP/COD/luminol/Alg hydrogels: 95 mM luminol, COD: HRP=1: 5. (D) Optimization the ratio of COD: HRP. For HRP/COD/luminol/Alg hydrogels: 95 mM luminol, 20 U/mL COD. Reaction condition: 100  $\mu$ L hydrogels with 100  $\mu$ L 0.1 mM cholesterol. Exposure time: 30 s.

## Comparison of different systems for cholesterol detection



**Figure S4** Comparison of different systems for cholesterol detection. Cholesterol: 0.1 mM.

**Table S1** Comparison of material-based detection methods for cholesterol detection

Material	Method	Linear range ( $\mu\text{M}$ )	LOD ( $\mu\text{M}$ )	Reference
AuE/dithiol/AuNPs/MUA/C hOx	electrochemistry	40–220	34.6	[1]
$\text{Fe}_3\text{O}_4@\text{MIL-100}(\text{Fe})$	colorimetric	2–50	0.8	[2]
Polypyrrole nanoparticles (PPy NPs)	colorimetric	10–100	3.5	[3]
CuO/graphene nanosphere(CuO:GNS)	colorimetric	100–800	78.0	[4]
AuNC@BSA	fluorescence	0–300	12.0	[5]
Pt /porous carbon (Pt/PCN)	colorimetric	25–500	8.3	[6]
HRP/COD/luminol/Alg hydrogels	Chemiluminescence	10–350	7.2	This work

**Table S2** Standard addition recovery experiments for cholesterol in human serum

Sample number	Added ( $\mu\text{M}$ )	Found ( $\mu\text{M}$ )	Recovery (%)	RSD (%) (n=3)
Serum 1	25.0	$24.5 \pm 0.5$	98.2	2.4
	50.0	$48.0 \pm 2.0$	96.1	4.0
	75.0	$78.5 \pm 2.5$	104.5	6.3
Serum 2	25.0	$25.5 \pm 1.5$	102.0	6.6
	50.0	$52.0 \pm 0.5$	103.8	0.6
	75.0	$72.0 \pm 3.5$	95.9	3.9
Serum 3	25.0	$23.0 \pm 0.5$	92.8	2.7
	50.0	$50.0 \pm 1.5$	100.4	2.9
	75.0	$80.5 \pm 1.5$	107.5	1.8

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