Supporting Information

Metal-Organic Framework-Based Oxygen Carriers with Antioxidant Protection as a Result of a Polydopamine Coating

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KEYWORDS

haemoglobin-based oxygen carriers; metal-organic framework; red blood cell membranes; polydopamine; redox activity, antioxidant property

MATERIALS AND METHODS

Materials.

Fluorescein isothiocyanate (FITC), dimethyl sulfoxide (DMSO), sodium bicarbonate ($NaHCO_3$), Sodium chloride (NaCl), aluminium chloride hexahydrate ($AlCl_3 \cdot 6H_2O$), *N,N'*-dimethylformamide (DMF), acetone, trifluoroacetic acid > 99% (TFA), were obtained from Merck Life Science A/S (Søborg, Denmark).

Preparation of fluorescently labelled Hb loaded NPs ($MOF^{Hb\text{-}FITC}$-NPs).

Hb was fluorescently labelled with FITC (Hb-FITC) as previously reported.[1] Briefly, a FITC solution (300 µL, 12.5 mg mL^{-1} in DMSO) was added to a Hb solution (6 mL, 5 mg mL^{-1} in 0.05 M $NaHCO_3$, pH 10) in a dropwise manner. After overnight incubation at room temperature (RT), the excess of FITC was thoroughly removed by dialysis against ultrapure water [Milli-Q (MQ), gradient A 10 system, TOC < 4 ppb, resistance 18 MV cm, EMD Millipore, USA] for two days. The collected solution was freeze-dried for future use.

A mixture of $AlCl_3 \cdot 6H_2O$ (120 mL, 3 mg mL^{-1} in DMF), H_3TATB (120 mL, 1 mg mL^{-1} in DMF) and TFA (0.4 mL) was incubated at 95 °C for 24 h for crystalline growth. After incubation, the resulting MOF-NPs were collected and washed successively in DMF (3×, 20 min, 15 000 g) and acetone (3×, 20 min, 15 000 g), and dried in a vacuum oven.

For encapsulation of fluorescently labelled Hb, the solution of Hb-FITC (1 mL, 2 mg mL^{-1} in MQ) was added to 1 mL of the MOF-NPs suspension (1 mg mL^{-1} in MQ) under continuous magnetic stirring. The mixture was incubated at RT for 2 h under magnetic stirring at 800 rpm. The $MOF^{Hb\text{-}FITC}$-NPs were obtained after washing with MQ (3×, 20 min, 15 000 g).

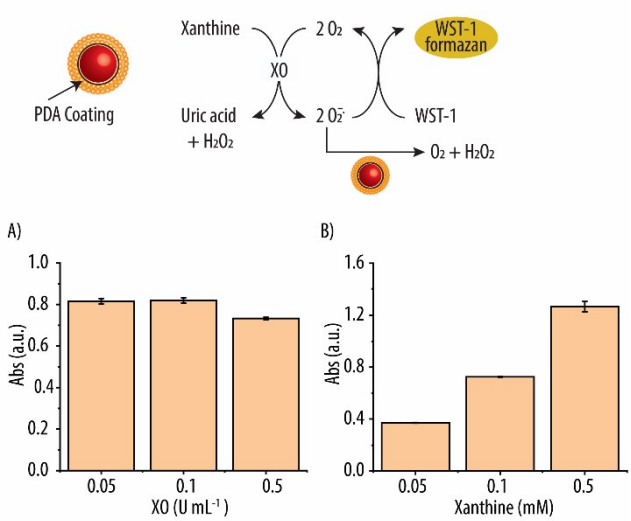

Figure S1. Scavenging of the superoxide radical anion ($O_2^{\bullet-}$) evaluated by the WST-1 assay. $O_2^{\bullet-}$, which is able to oxidize the WST-1 reagent into the yellow formazan product, is generated by the xanthine/xanthine oxidase (XO) system. A) The absorbance (Abs) readings of different concentrations of XO and 0.1 mM xanthine. B) The Abs readings of different concentrations of xanthine in the presence of XO at 0.05 U mL^{-1}.

(1) York-Duran, M. J.; Ek, P. K.; Godoy-Gallardo, M.; Hosta-Rigau, L. Shear Stress Regulated Uptake of Liposome-Decorated Microgels Coated with a Poly (Dopamine) Shell. *Colloids Surfaces B Biointerfaces* **2018**, *171*, 427–436.