Electronic Supplementary Information

Improvement in the catalytic activity of cytochrome c by immobilisation on a novel mesoporous silica sheet

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Experimental

Materials
All chemicals were of analytical grade and used without further purification. Cetyltrimethylammonium chloride (CTAC, 326-27712), L-alanine (2701) and palmitoyl chloride (164-00133) were purchased from Wako Pure Chemical Industries, Japan. The tri-block copolymer Pluronic™ P123 (molecular formula (EO)$_{20}$(PO)$_{70}$(EO)$_{20}$, 435465) and cytochrome c from equine heart (C2506) were purchased from Sigma–Aldrich, St Louis, MO. Tetraethoxysilane (TEOS, KBE-04) and 3-aminopropyltriethoxysilane (APTES, KBE-903) were purchased from Shin-Etsu Chemical Co., Japan. SBA-15 and MCM-41 were prepared according to the procedure reported in the literature.¹

Characterisation
The morphology of the prepared samples was observed using a FE-SEM (S4300, Hitachi, Japan) operated at an accelerating voltage of 10 kV and a TEM (JEM 2010, JEOL, Japan) operated at 200 kV. The structural properties of the prepared samples were determined using a small-angle X-ray diffractometer (XRD, RINT2100V/PC, Rigaku, Japan) (Fe-Kα, 40 kV, 30 mA). The specific surface area and pore volume of the samples were analysed by nitrogen adsorption–desorption isotherms and the pore size distribution curves were obtained by the Barret–Joyner–Halenda (BJH) method using a micrometrics analyser SHIMADZU TriStar 3000, Japan. Oxidation activity of cyt c was analysed with a UV–Vis spectrophotometer (V-560, Jasco, Japan) at a wavelength of 500 nm.

Reference
Fig. S1 Nitrogen adsorption–desorption isotherms of SBA-15, MCM-41 and the MPS sheet.
Fig. S2 Pore size distributions of (A) SBA-15 and MCM-41 and (B) MPS sheet.
**Fig. S3** N$_2$ adsorption–desorption isotherms of MPS sheet and cyt c immobilised on MPS sheet.
**Fig. S4** Lineweaver–Burk plot of cyt c (free and immobilised on the MPS sheet) oxidation activity.