

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 PluronicTM 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-K α , 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

- 1 T. Orita, K. Kato and M. Tomita, *J. Ceram. Soc. Jpn.*, 2011, **119**, 238–245.

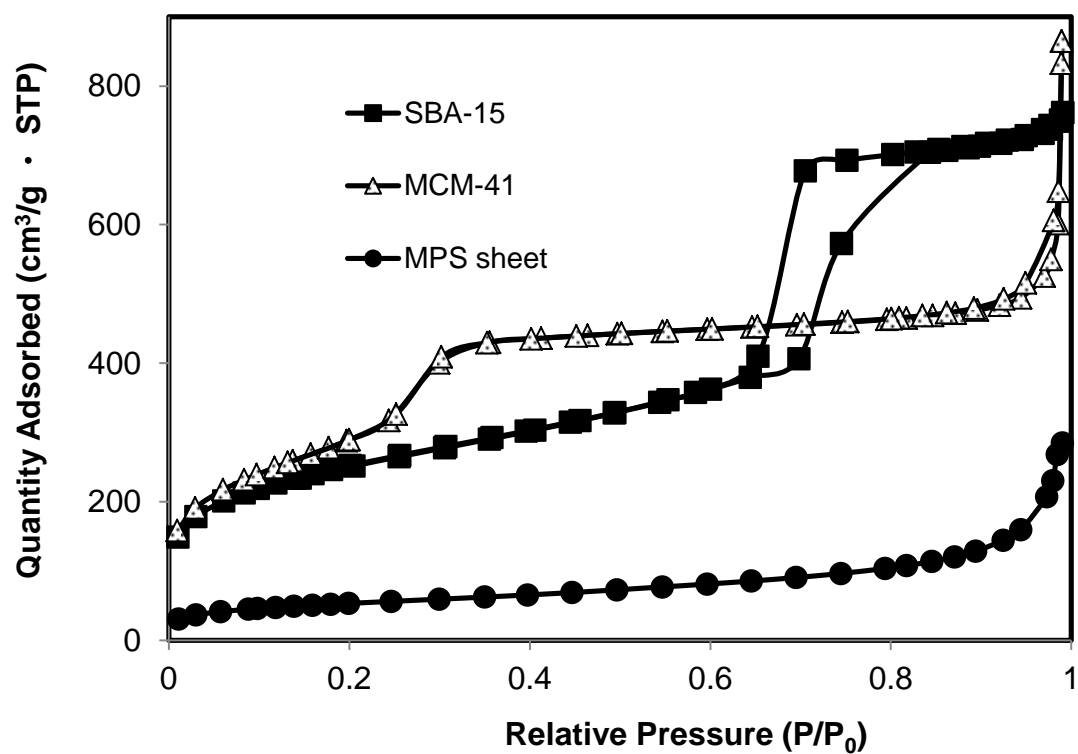


Fig. S1 Nitrogen adsorption–desorption isotherms of SBA-15, MCM-41 and the MPS sheet.

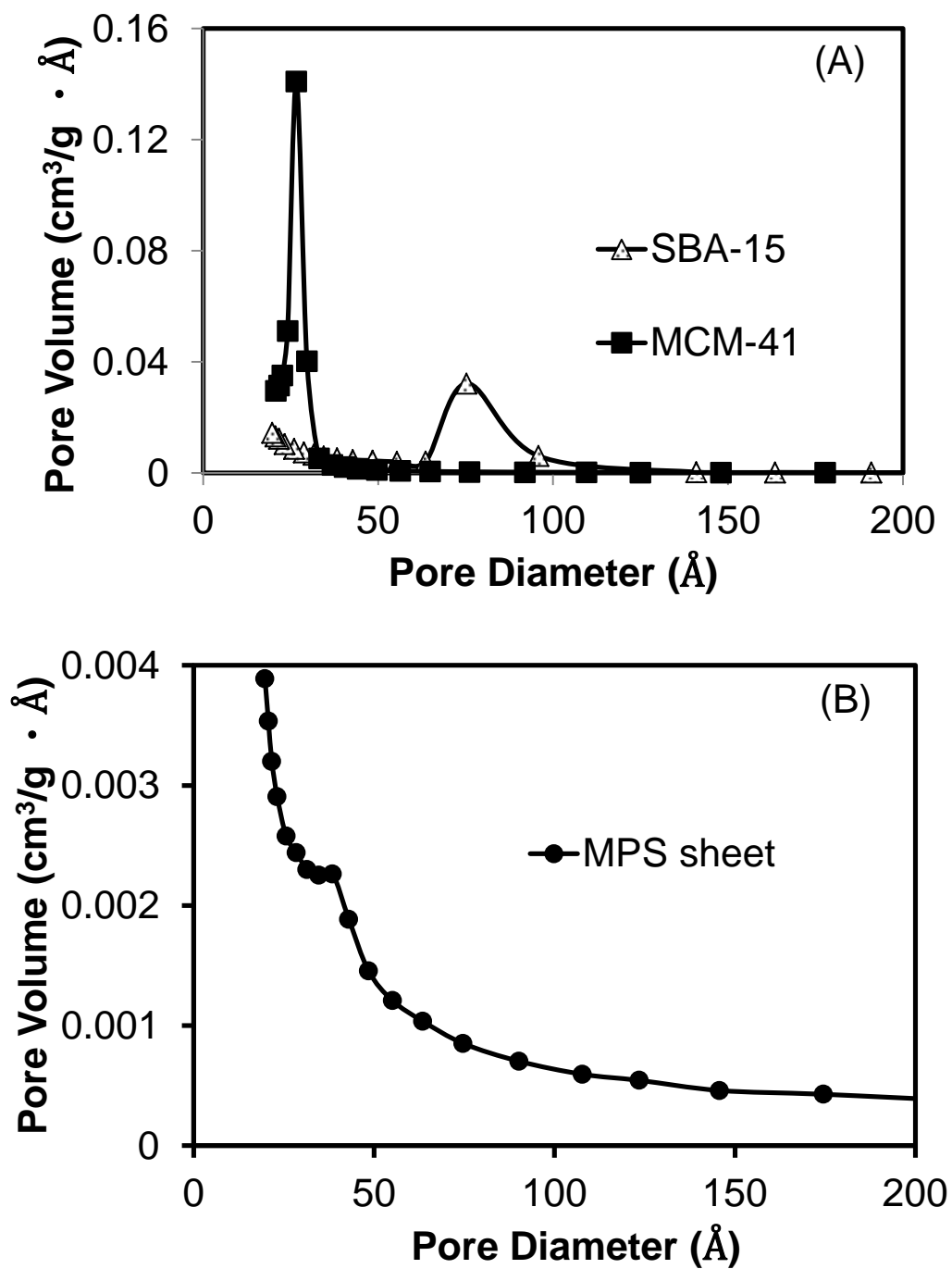


Fig. S2 Pore size distributions of (A) SBA-15 and MCM-41 and (B) MPS sheet.

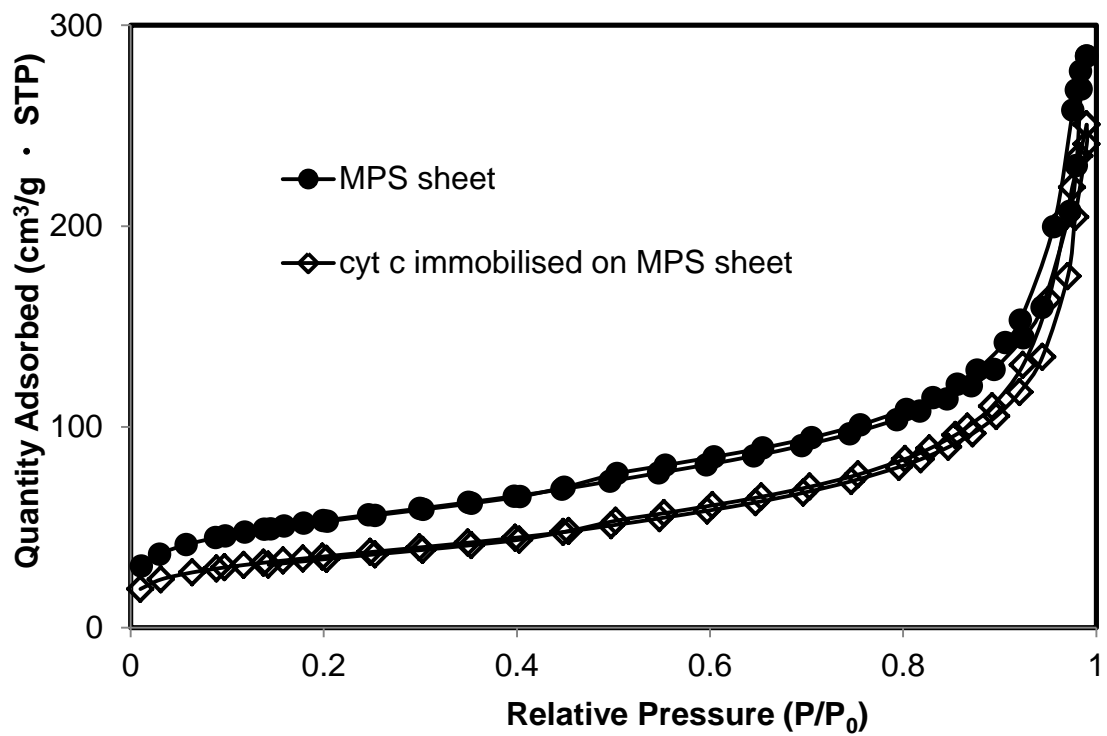


Fig. S3 N₂ adsorption–desorption isotherms of MPS sheet and cyt *c* immobilised on MPS sheet.

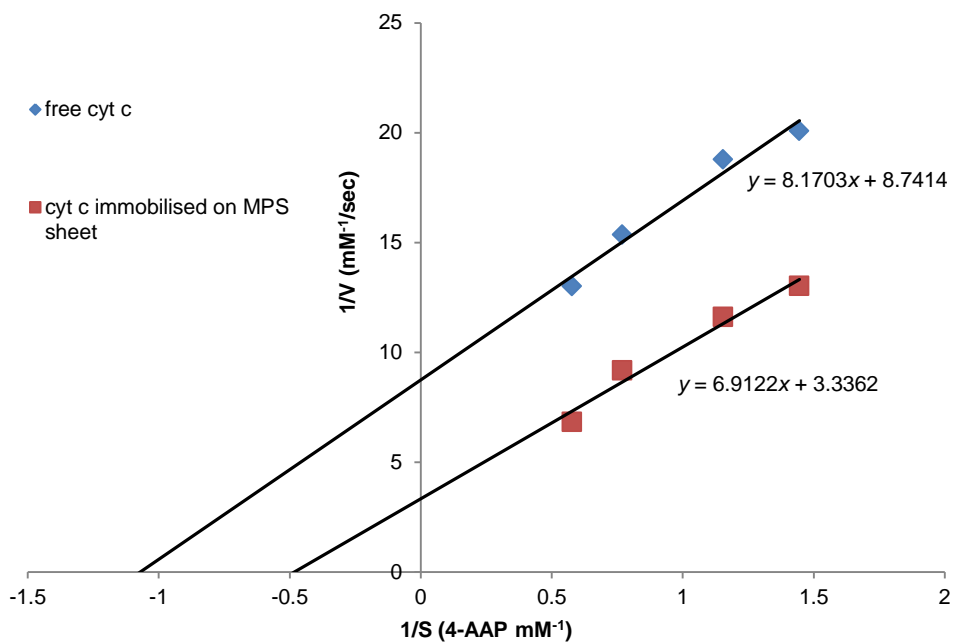


Fig. S4 Lineweaver–Burk plot of cyt *c* (free and immobilised on the MPS sheet) oxidation activity.