

## Supporting Information

### Backscattered Electron (BSE) Imaging of Platinum Nano-Particles Dispersed in Mesoporous Silica

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#### Structural evaluation of mesoporous silica containing Pt nano-particles using N<sub>2</sub> adsorption-desorption, XRD measurements and HR-SEM with backscattered electrons (BSE).

The N<sub>2</sub> adsorption-desorption isotherm of mesoporous silica before the incorporation of a Pt source was type IV with an H1 hysteresis loop, which is typically observed for cylinder-type mesoporous silica (Fig. S1(a)). The BET surface area, the pore volume and the average pore size, which was calculated by employing the Broekhoff-de Boer equation with the D-H algorithm using a cylindrical pore model, of pure mesoporous silica were 923 m<sup>2</sup> g<sup>-1</sup>, 0.92 cm<sup>3</sup> g<sup>-1</sup> and 6.8 nm, respectively. The N<sub>2</sub> adsorption-desorption isotherm of mesoporous silica containing Pt nano-particles was also type IV with an H1 hysteresis loop as with pure mesoporous silica, and the BET surface area decreased to 544 m<sup>2</sup> g<sup>-1</sup>. Pt/mesoporous silica exhibited a two-step desorption isotherm in a relative pressure range of 0.5 to 0.6. This is related to the pore blocking effect.<sup>S1-S3</sup> The desorption of nitrogen molecules is impeded by the presence of Pt nano-particles in the mesoporous silica channel. The XRD pattern of Pt/mesoporous silica contained three peaks assigned to the (100), (110) and (200) 2D hexagonal *p6mm* structures with a *d*<sub>100</sub> spacing of 9.8 nm for diffraction angles lower than  $2\theta = 2^\circ$  (Fig. S2 right), and three XRD peaks assigned to the (111), (200) and (220) cubic *Fm3m* structures of Pt were also observed for higher diffraction angles (Fig. S2 left).

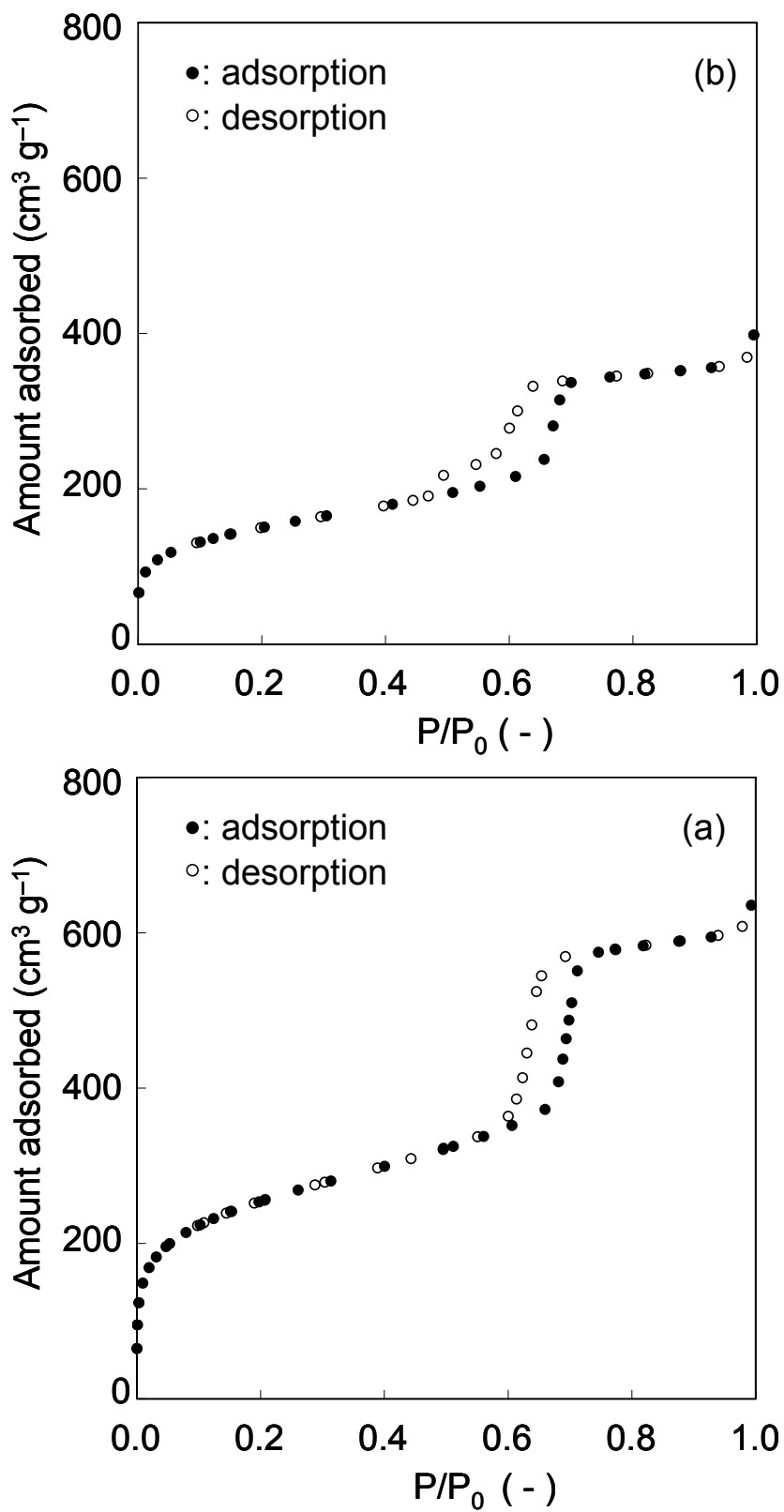


Fig. S1 Nitrogen adsorption-desorption isotherms of mesoporous silica (a) before and (b) after introducing the Pt source.

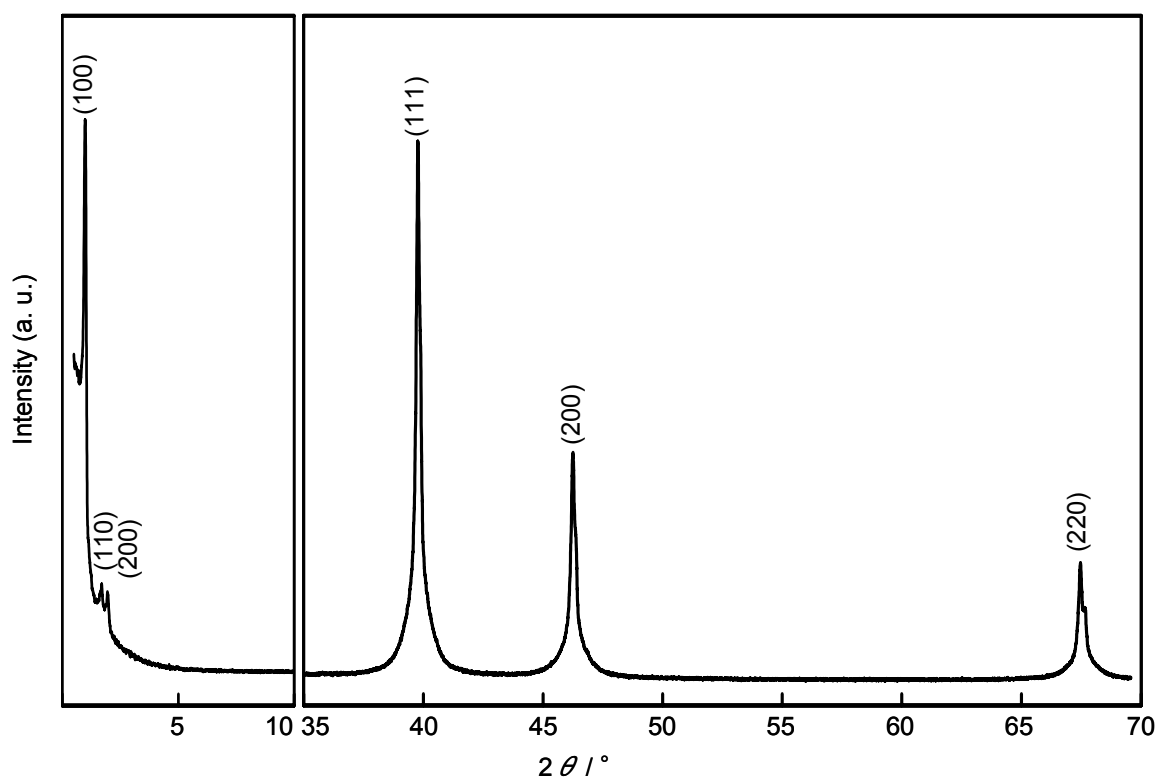


Fig. S2 XRD pattern of mesoporous silica containing Pt nano-particles.

## References

- S1 P. Van Der Voort, P. I. Ravikovitch, K. P. De Jong, A. V. Neimark, A. H. Janssen, M. Benjelloun, E. Van Bavel, B. M. Weckhuysen and E. F. Vansant, *Chem. Commun.*, 2002, 1010.
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