

Supplementary Material (ESI) for RSC Advances  
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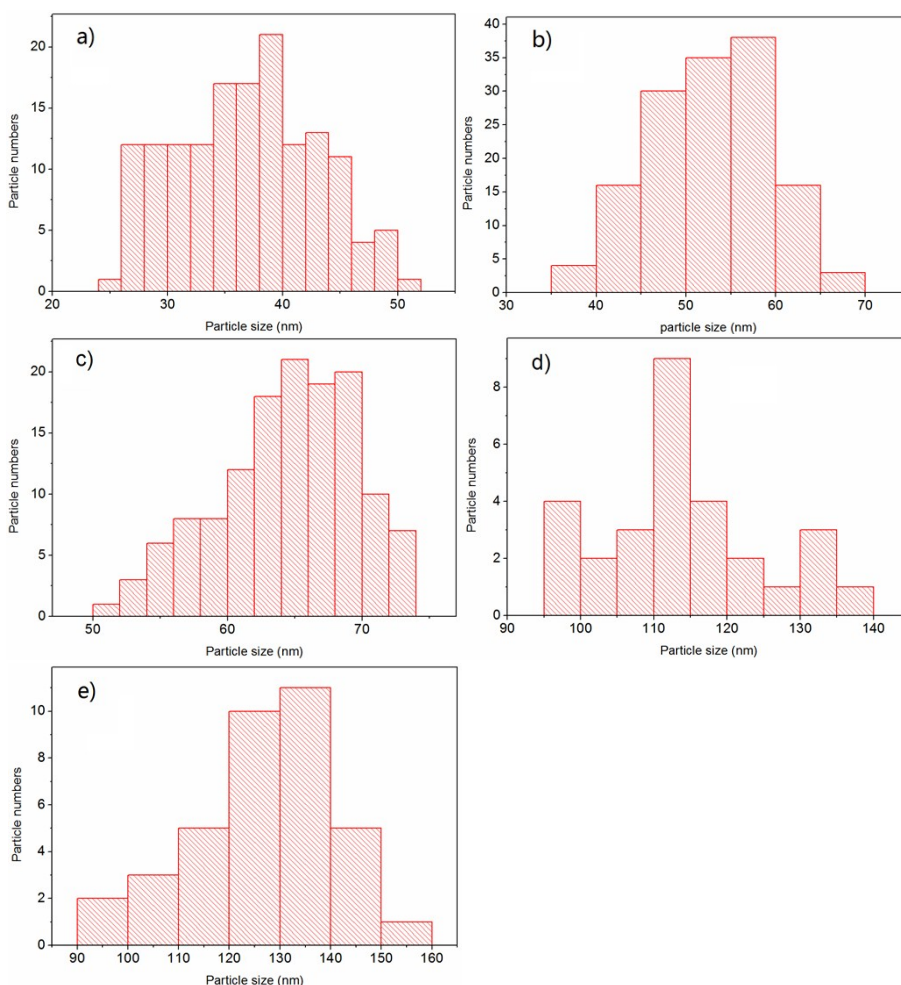
## Electronic Supplementary Information

### Facile, low-cost, and scalable fabrication of particle size and pore structure tuneable monodisperse mesoporous silica nanospheres as supports for advanced solid acid catalysts†

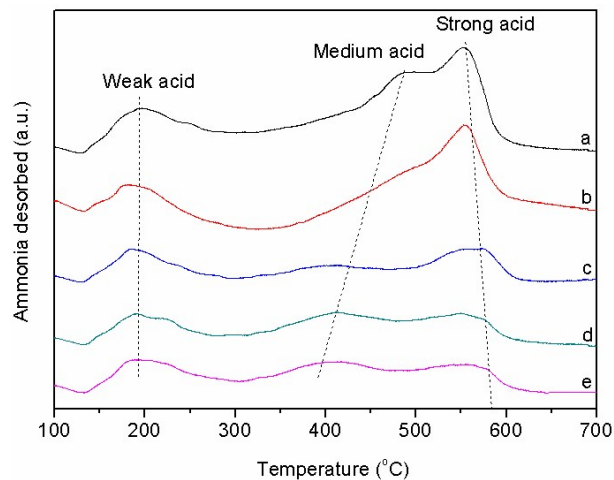
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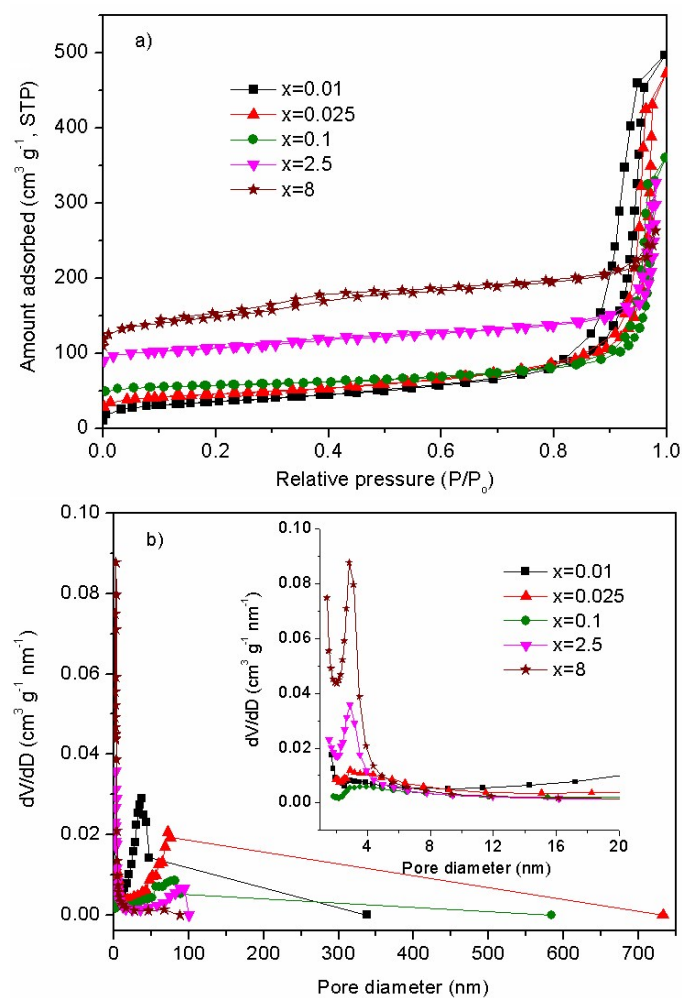
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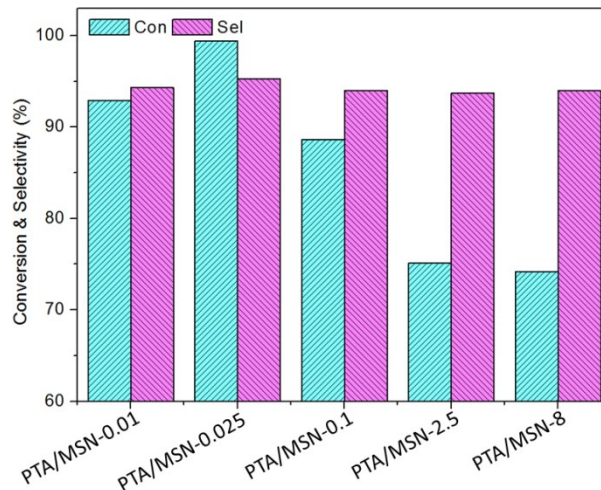
**Figure S1.** Particle size distribution of MSN-*x* from TEM images shown in Figure 1. a) MSN-0.01, b) MSN-0.025, c) MSN-0.1, d) MSN-2.5, and e) MSN-8.



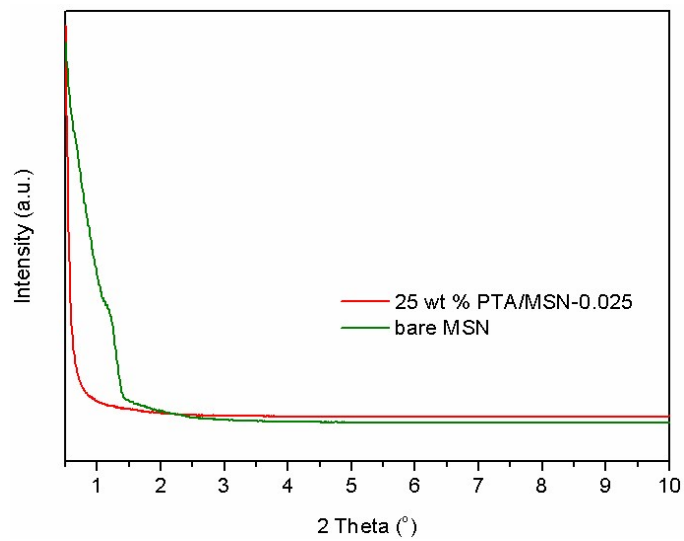
**Figure S2.** NH<sub>3</sub>-TPD profiles of the supported PTA catalysts on the as-synthesized MSN-*x* carriers. a) *x*=0.01, b) *x*=0.025, c) *x*=0.1, d) *x*=2.5, e) *x*=8.



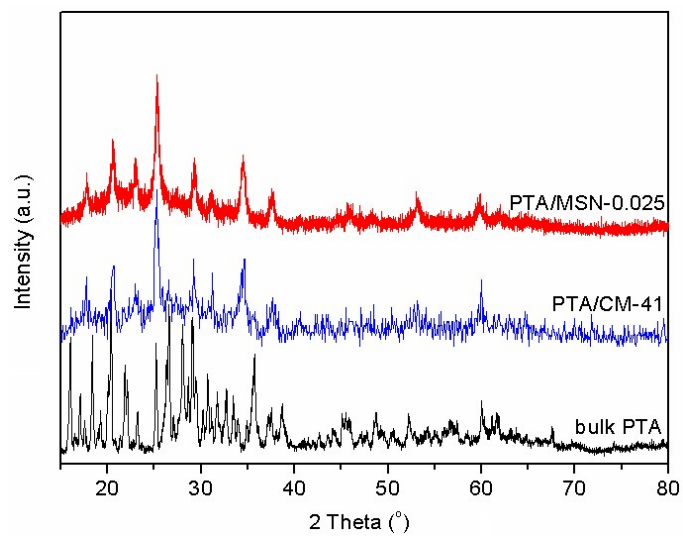
**Figure S3.**  $\text{N}_2$  adsorption-desorption isotherms (a) and the Barrett-Joyner-Halenda (BJH) pore size distribution from adsorption branch of the supported PTA catalysts on the diverse mesoporous silica nanospheres (MSN- $x$ ).



**Figure S4.** Catalytic performance of PTA/MSN- $x$  catalysts ( $x=0.01, 0.025, 0.1, 2.5,$  and  $8$ ) for alkenylation of  $p$ -xylene with phenylacetylene. Reaction conditions: catalyst  $0.8$  g;  $N_{p\text{-xylene/Phen}}$   $25:1$ ;  $T_r$   $150$  °C;  $P_s$   $1.0$  MPa;  $VHSV$   $7.2$  ml  $h^{-1}$   $g^{-1}$  cat;  $TOS$   $8$  h.



**Figure S5.** Low-angle XRD patterns of 25 wt % PTA/MSN-0.025 catalyst and bare MSN support.



**Figure S6.** XRD patterns of the PTA/MSN-0.025, PTA/MCM-41, and bulk PTA.