

Supporting Information

Synthesis of tetragonal zirconia in mesoporous silica and its catalytic property for methanol oxidative decomposition

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Table S.1

Physical properties of the synthesized KIT-6 without and with the calcination at various temperatures

Sample	Final calcination temperature / °C	S_{BET}^{*1} / m ² g ⁻¹	V_{pore}^{*2}	$V_{meso-pore}^{*3}$	$d_{meso-pore}^{*4}$ / nm
			/ cm ³ g ⁻¹	/ cm ³ g ⁻¹	
KIT-6-as	-	840	1.13	1.02	8.1
KIT-6-400	400	856	1.14	1.01	8.2
KIT-6-600	600	810	1.08	0.95	8.2
KIT-6-800	800	640	0.89	0.81	7.2

*1 BET specific surface area.

*2 Total pore volume: estimated at $0.99P/P_0$.

*3 Pore volume of meso-pores: estimated by the BJH method.

*4 Major meso-pore diameter peaks: estimated from adsorption branch by the BJH method.

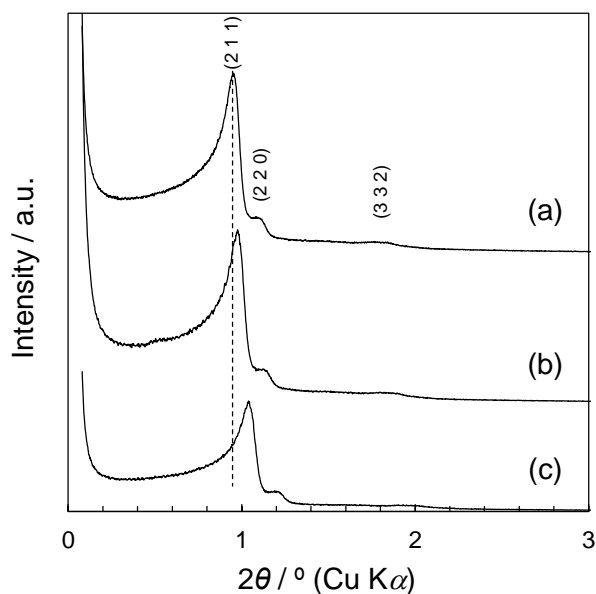


Figure S.1 Small-angle X-ray scattering patterns of the synthesized KIT-6: (a) As-prepared (calcined at 550 °C), with the re-calcination at (b) 600 °C, and (c) 800 °C.

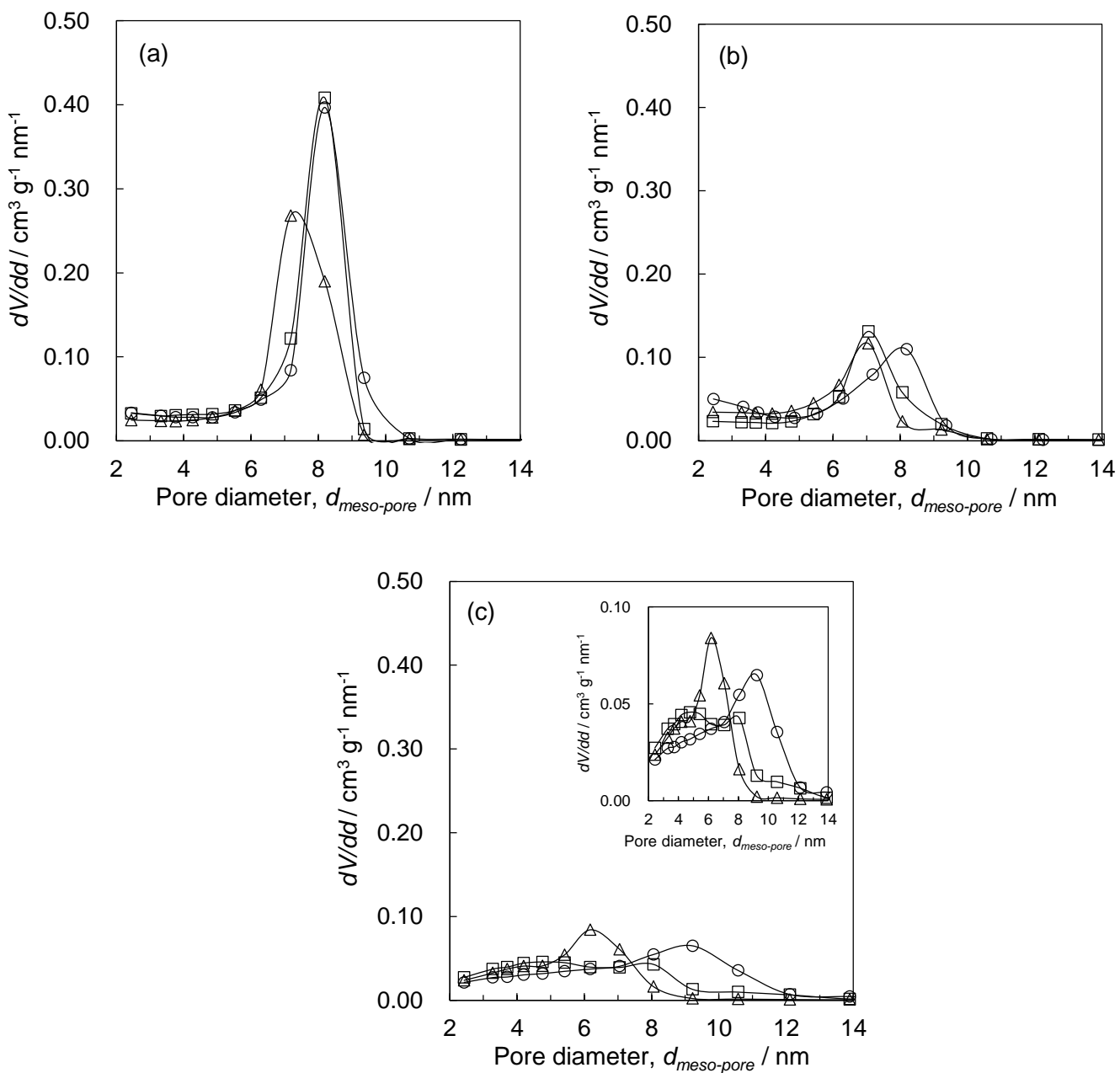


Figure S.2 Pore size distribution by the BJH method of (a) Z20N/K(T), (b) Z50N/K(T), and (c) Z80N/K(T): T = (○) 400, (□) 600, (△) 800.

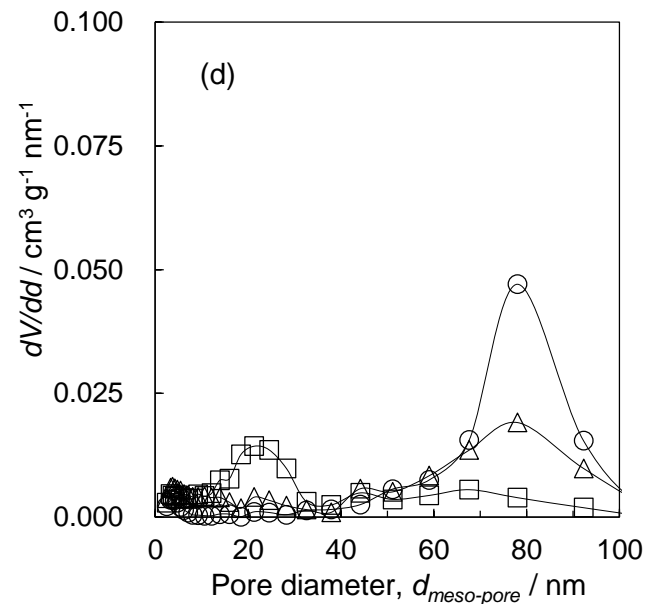
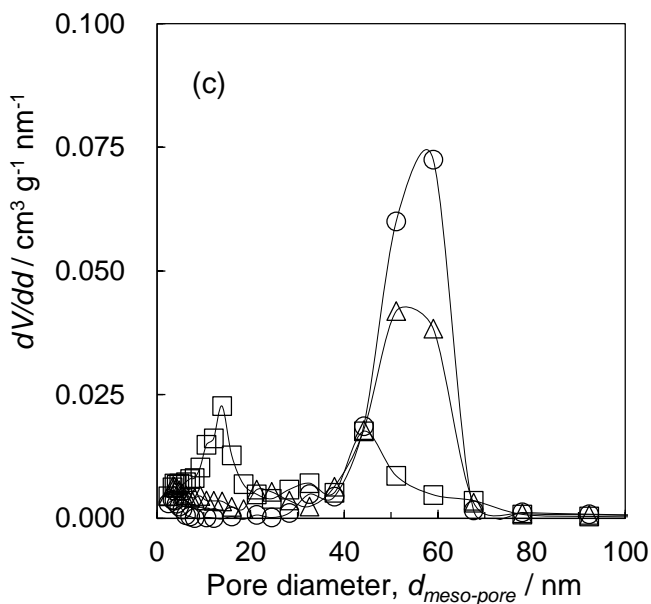
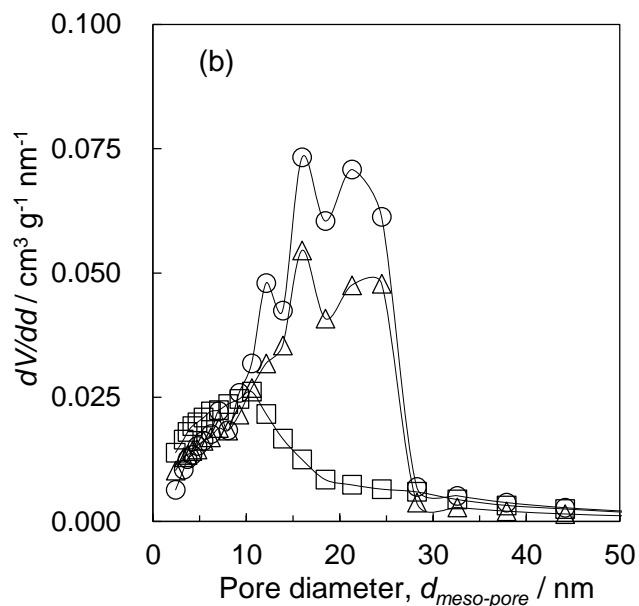
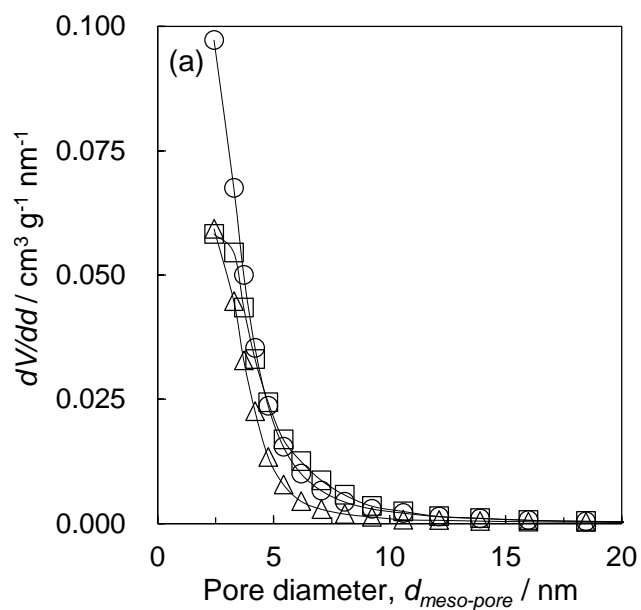


Figure S.3 Pore size distribution by the BJH method of (a) ZNX/Q-3, (b) ZNX/Q-10, (c) ZNX/Q-30, and (d) ZNX/Q-50; X = (○) 0, (△) 20, (□) 50.

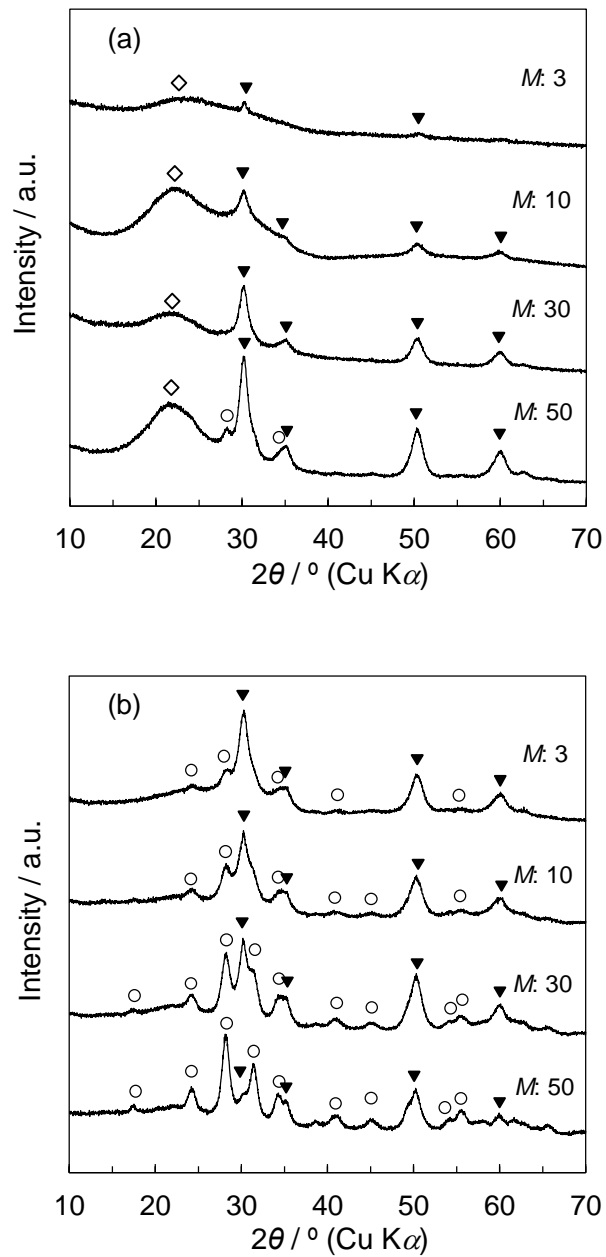


Figure S.4 Wide-angle XRD patterns of the $\text{ZrO}_2/\text{SiO}_2$ composites: (a) Z20N/Q- M and (b) Z50N/Q- M ; M : 3, 10, 30, 50; (\circ) ZrO_2 -monoclinic, (\blacktriangledown) ZrO_2 -tetragonal, (\diamond) SiO_2 .