Supporting Information

S 1. Estimate of residence times.

Silica	d=40 mm, L=400 mm		
	Q_1（L/h）	Q_2（L/h）	t（s）
SiO_2-4 s	60	390	4
SiO_2-5 s	60	300	5
SiO_2-7 s	60	200	7
SiO_2-10 s	40	140	10
SiO_2-14 s	30	100	14
SiO_2-18 s	20	80	18

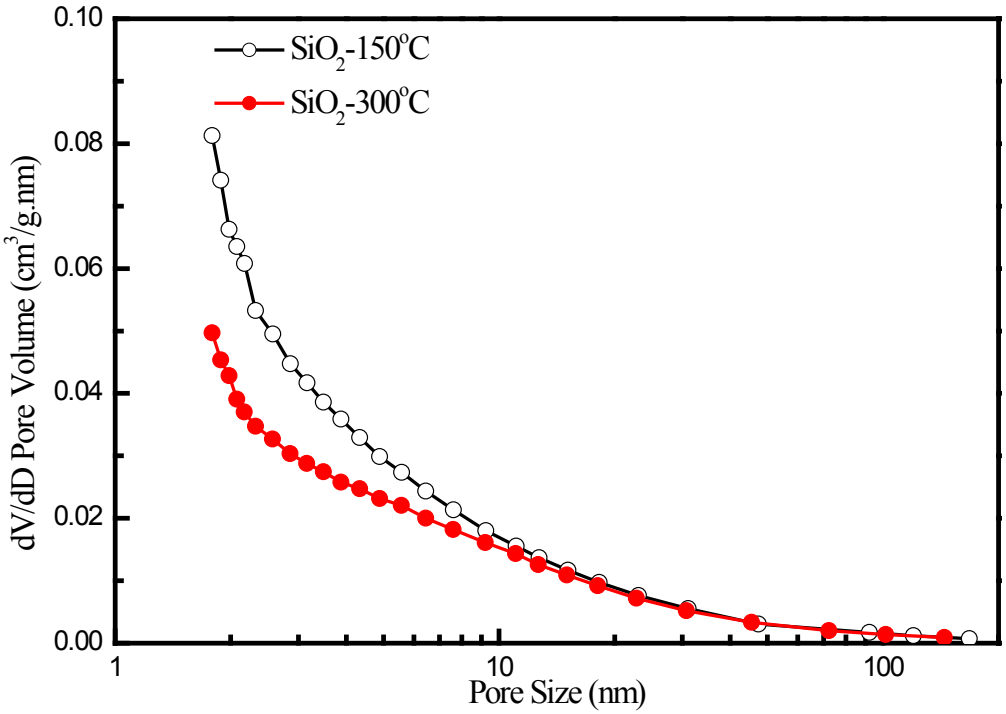
Notes: In this hydrolysis system, the residence time is described by$t = \frac{1/4\pi d^2 L}{Q_1+Q_2}$, where d is the diameter of the glass tube, mm; L is the heated length of the glass tube, mm; and Q_1 and Q_2 refer to the flow rate of N_2 passing through silicon vapor and water vapor, respectively, L/h.

S 2. The basic parameters for thermodynamic calculations of hydrolysis reaction of Equation 1

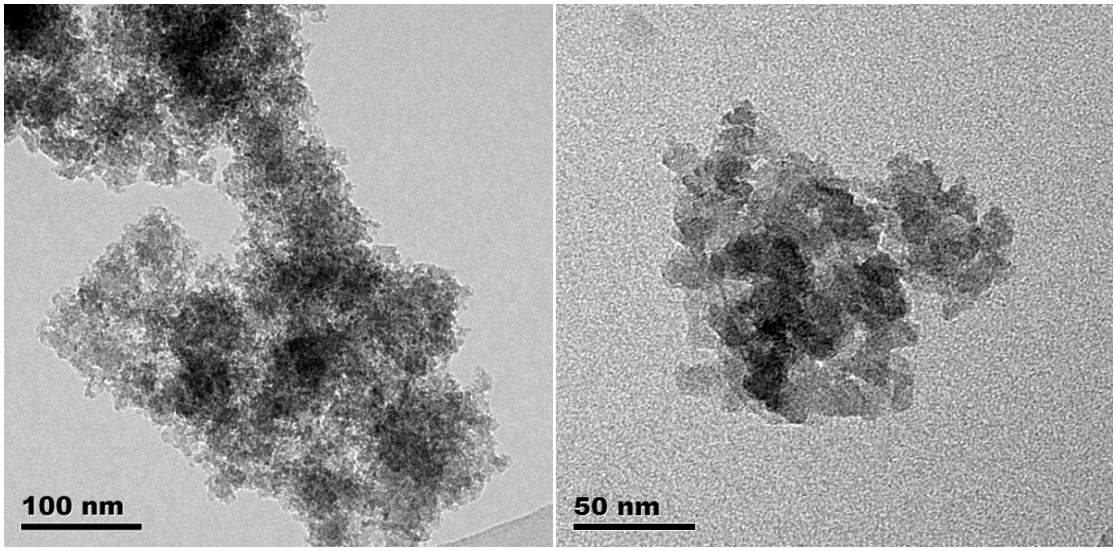
Substance	Physical State	$\triangle_f H^\theta$ (KJ/mol)	$\triangle_f G^\theta$ (KJ/mol)	S (J/deg·mol)	C_p (J/deg·mol)
$SiCl_4$	g	-657	-617	330.7	90.26
H_2O	g	-241.826	-228.61	188.835	33.6
SiO_2	c	-910.7	-856.4	41.46	44
HCl	g	-92.31	-95.3	186.902	29.12

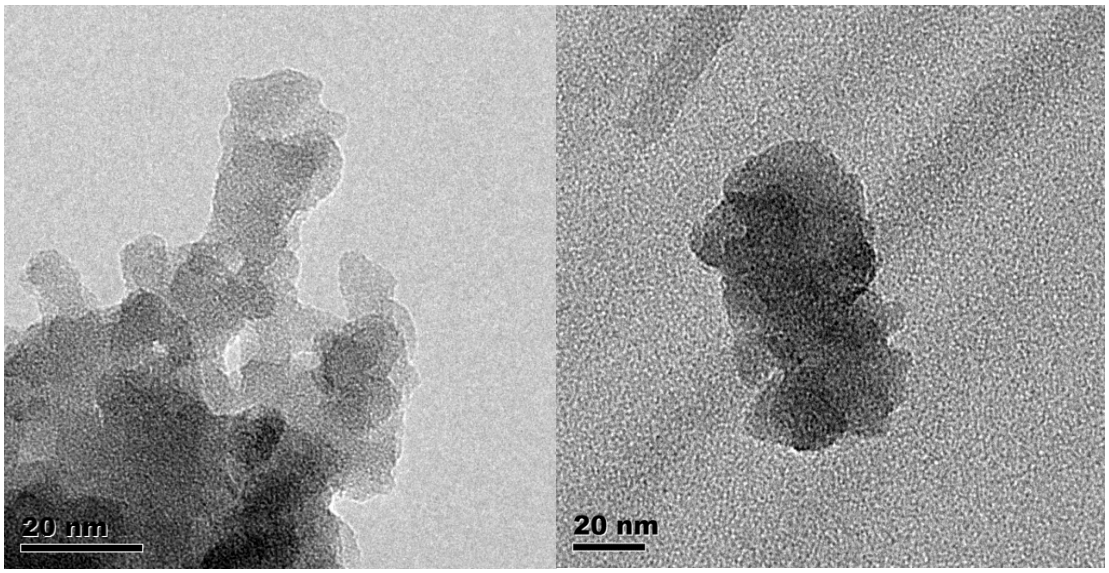
S 3. The enthalpy change and the Gibbs free energy change of reaction Equation 1 under different reaction temperatures

Temperature(^{o}C)	$\triangle_f$H(KJ/mol)	$\triangle_f$G(KJ/mol)
Standard Condition	-139.29	-163.4
125	-138.99	-171.1
150	-138.91	-173.1
175	-138.84	-175.0
200	-138.76	-177.0
225	-138.68	-178.9
250	-138.61	-180.9
275	-138.53	-182.8
300	-138.46	-184.7

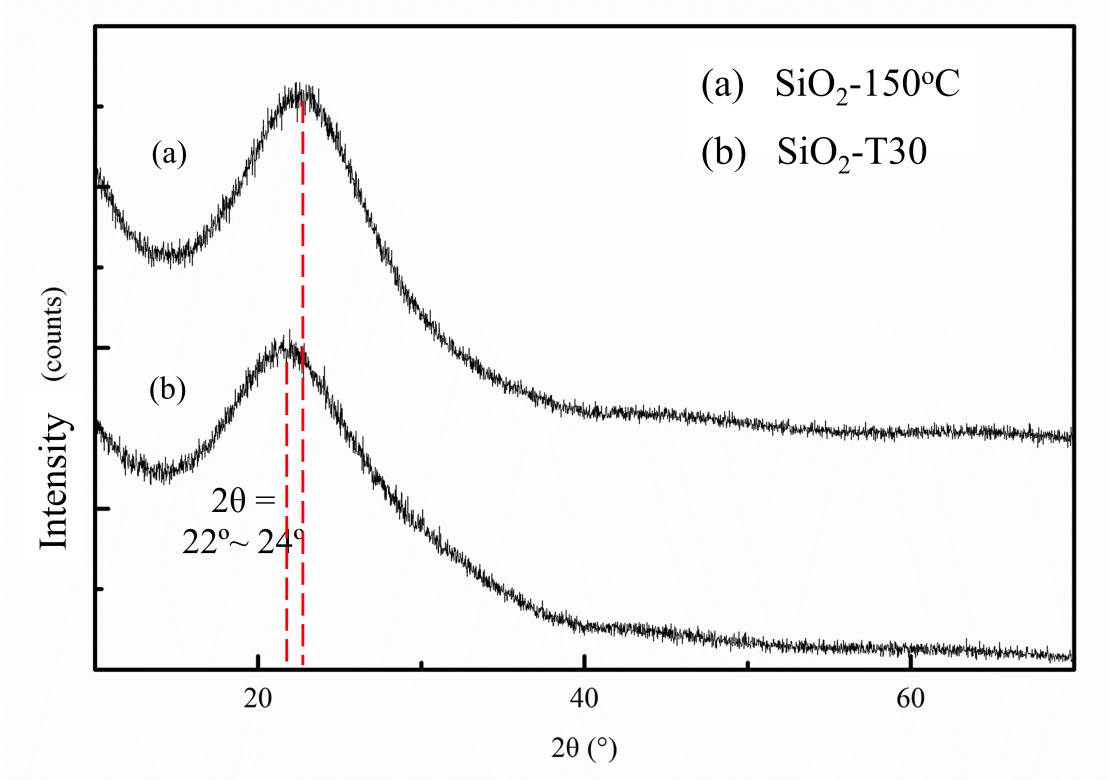


S 4. BJH dV/dD pore volume distribution of SiO_2-150 °C and SiO_2-300 °C, calculated by the adsorption branch of the N_2 adsorption/desorption isotherms





S 5. TEM images of silica nanoparticles produced by low temperature vapor phase hydrolysis method with a residence time of 10s (SiO_2-10s) at different magnifications



S 6. XRD patterns of silica nanoparticles produced by low temperature vapor phase hydrolysis method (SiO_2-150 ^oC) and silica naoparticles produced by hydrogen-oxygen flame method (SiO_2-T30)

Note: T30 is commercial silica naonoparticles produced by Wacker Chemie, and the specific surface area is 300±30 m^2/g.