

^{29}Si NMR Studies of Zeolite Precursor Solutions

Supporting Information

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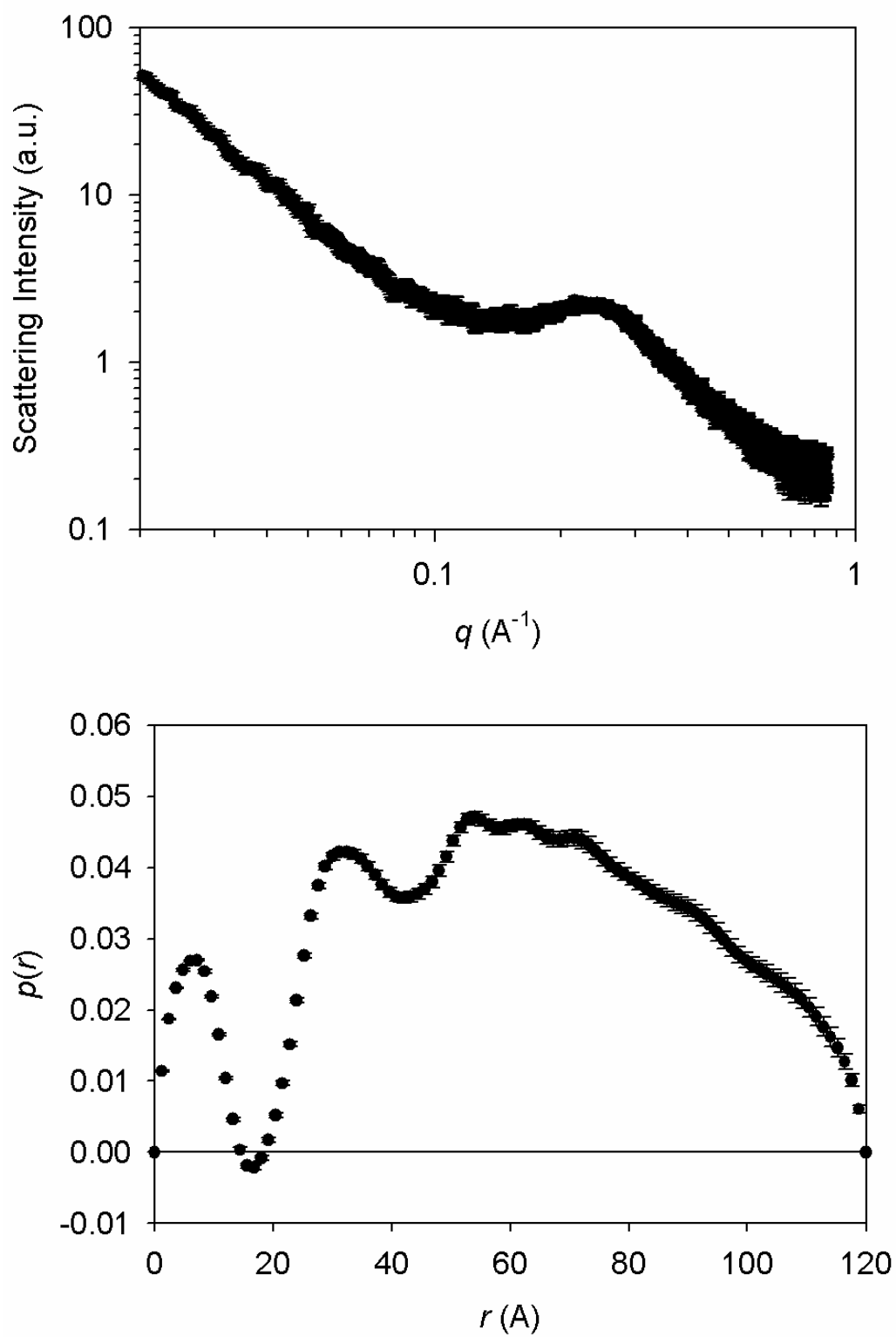


Figure 1S. (top)SAXS data of sample measured in Figures 1,2, and 4. (bottom) pair distance distribution function (determined using the packing GNOM).

Estimation of the relative population of the 2 nm and 20 nm particles from the SAXS data

$$M = \frac{I(0)a^2}{P(\Delta\rho^2)dcI_e N}$$

a : the distance between the sample and the detector.

d : is the sample thickness.

P : is the total intensity,

c : is the concentration of the solute,

I_e : is the scattering intensity of a single electron, 2

N : the Avogadro's number

$\Delta\rho$: the excess electron density.

M is the molecular weight. Here it is assumed to be the particle weight, based on that the mass can be estimated as

$$M = \frac{4}{3}\pi(r)^3 \rho$$

ρ : the density of the particle

r : the radius of the particle

Then

$$\frac{M_1}{M_2} = \frac{I_1(0)c_2}{I_2(0)c_1}$$

$$\frac{c_1}{c_2} = \frac{I_1(0)M_2}{I_2(0)M_1} = \frac{I_1(0)(r_2)^3}{I_2(0)(r_1)^3}$$

assuming the density of the particles with different particle size are the same.

Divide the SAXS curve into two parts:

(1) $0.02 \leq q \leq 0.11$

(2) $0.15 \leq q \leq 0.8$

$I_1(0) = 94$, and $I_2(0) = 4.68$. $r_1 = 10$ nm and $r_2 = 1$ nm

$$c_2 \approx 50 c_1$$

The $I(0)$ values used were estimated/determined using the inverse fourier transform method (software package – GNOM)

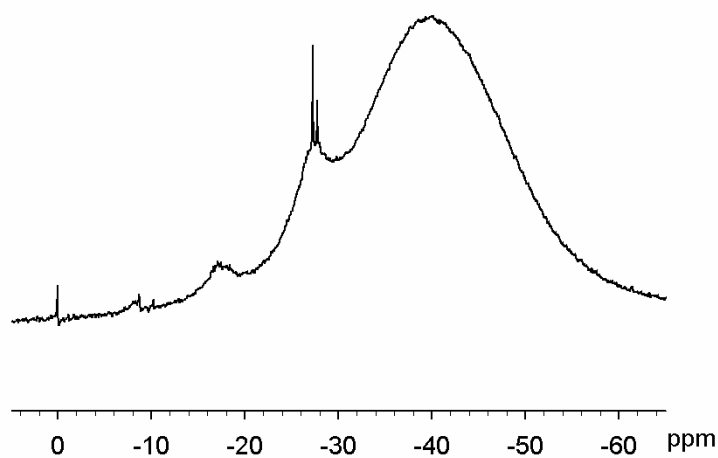


Figure 2S. NMR spectrum of a solution with composition 1 TEOS: 0.18 TMBDMP[OH⁻]₂: 20 H₂O, (TMBDMP[OH⁻]₂ = 4,4'-trimethylene-bis(1,1'-dimethylpiperidinium) dihydroxide) aged at room temperature for 24 hours. Chemical shifts referenced to monomer as $\delta = 0$ ppm.

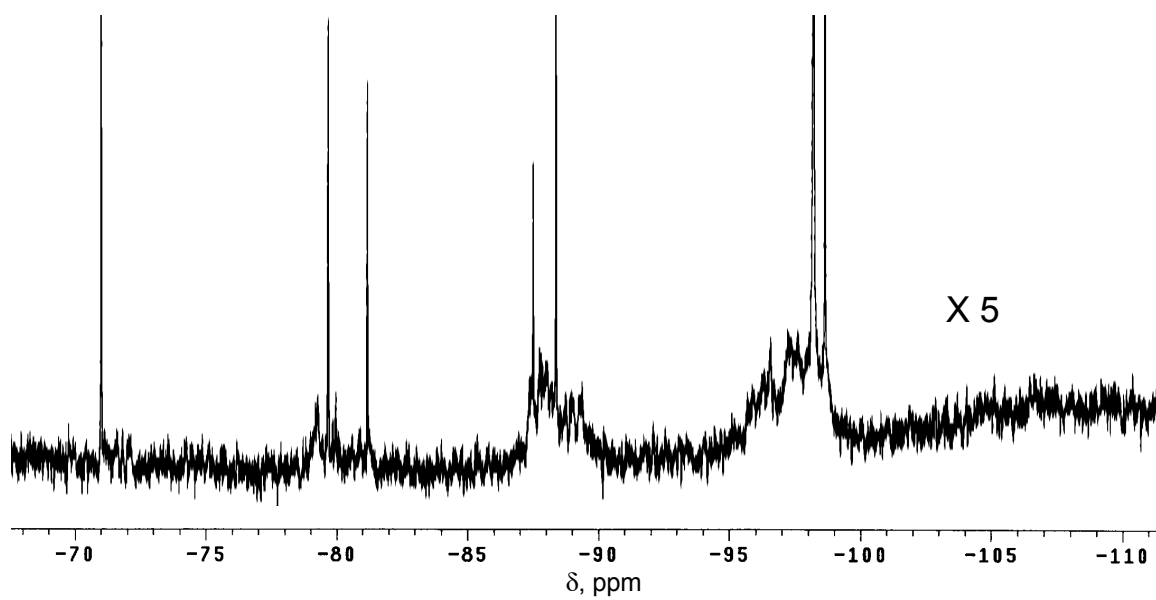


Figure 3S. Expanded plot of Figure 5, showing the low intensity resonances.