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Corrugated and nanoporous silica microspheres: synthesis by controlled etching, and improving their chemical adsorption and application in biosensing

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Table S1. Pore-volume and surface area data of as-prepared and etched silica microspheres.

Silica Nanosphere Samples	Surface Area (m^2/g)	Pore Volume (cm^3/g)
Si450	4.8	0.015
Si450-KCN-H4	5.3	0.019
Si450-KCN-H8	6.3	0.030
Si450-KOH-H4	5.5	0.040
Si450-KOH-H8	8.3	0.035

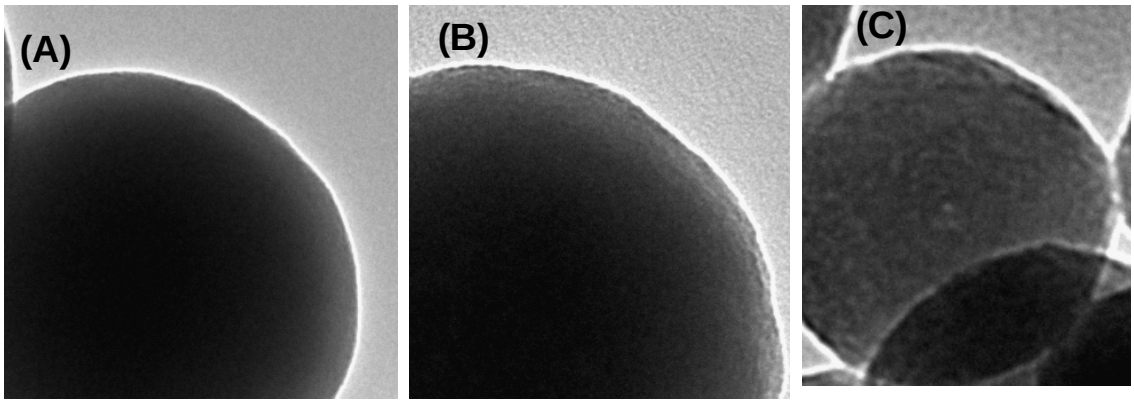

Figure S1. Enlarged TEM image of silica microspheres of average diameter of (A) ~450, (B) ~250 and (C) ~110 nm and that are labeled as **Si450**, **Si250** and **Si110**, respectively. The full images with scale bars are shown on Fig. 1 in the paper.

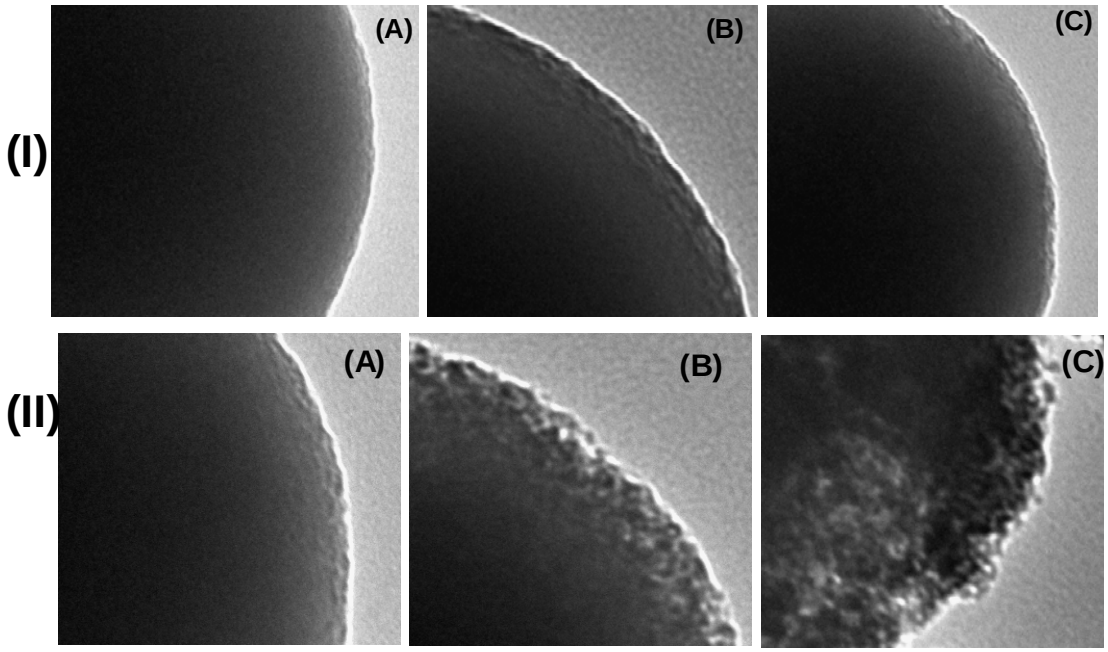

Figure S2. Enlarged TEM images of 100 μL, 10 mg/mL of silica microspheres of average diameter of 450 nm (Si450) after etching with (I) 1 mL of high KCN concentration (0.03 M, pH = 11.00) for (A) 1, (B) 4, and (C) 8 h resulting in samples Si450-KCN-H1, Si450-KCN-H4, and Si450-KCN-H8, respectively; and (II) 1 mL of high KOH concentration (0.03 M, pH = 12.60 for (A) 1, (B) 4, and (C) 8 h resulting in samples Si450-KOH-H1, Si450-KOH-H4, and Si450-KOH-H8, respectively.

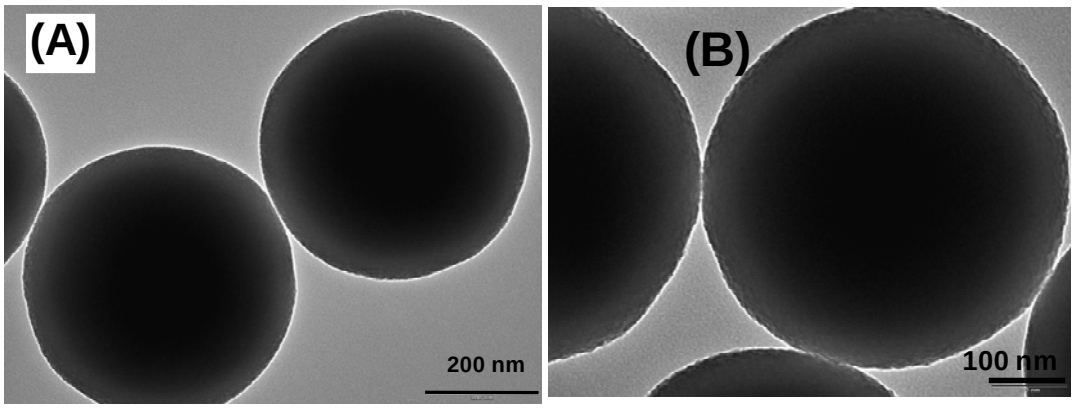

Figure S3. TEM images of 100 μL, 10 mg/mL of silica microspheres of average diameter of 450 nm (**Si450**) after etching for 4 h with 1 mL of low KOH concentration (pH = 10.61), which is of the same pH as the high concentration KCN used.

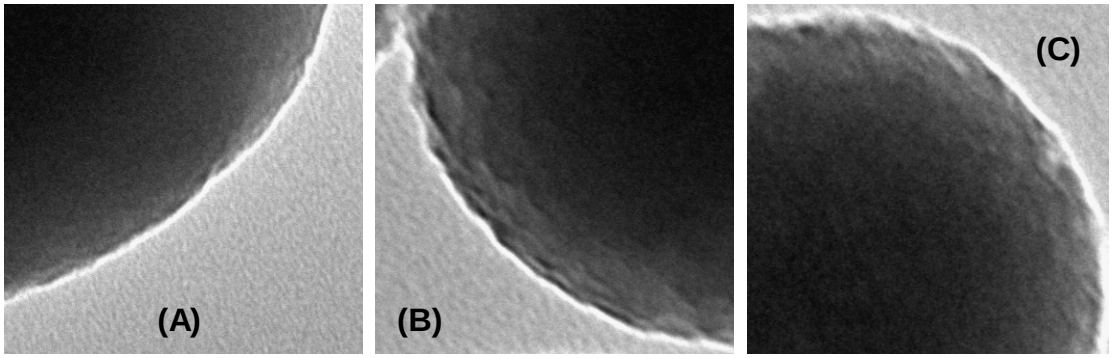

Figure S4. Enlarged TEM images of 100 μL, 10 mg/mL of silica microspheres of average diameter of 250 nm (Si250) after etching with 1 mL of higher KCN concentration (0.03 M, pH = 11.00) for (A) 1, (B) 4, and (C) 8 h resulting in samples Si250-KCN-H1, Si250-KCN-H4, and Si250-KCN-H8, respectively.

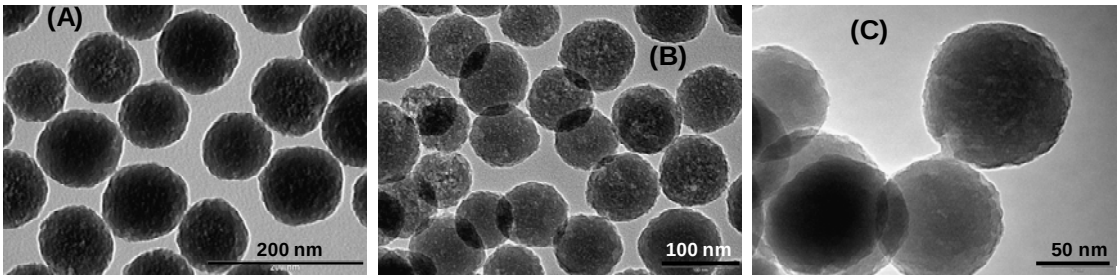

Figure S5. TEM images of 100 μL, 10 mg/mL of silica microspheres of average diameter of 110 nm (**Si110**) after etching with 1 mL of higher KCN concentration (0.03 M, pH = 11.00) for (A) 4, (B) 13 and (C) 23 h under *static* condition.

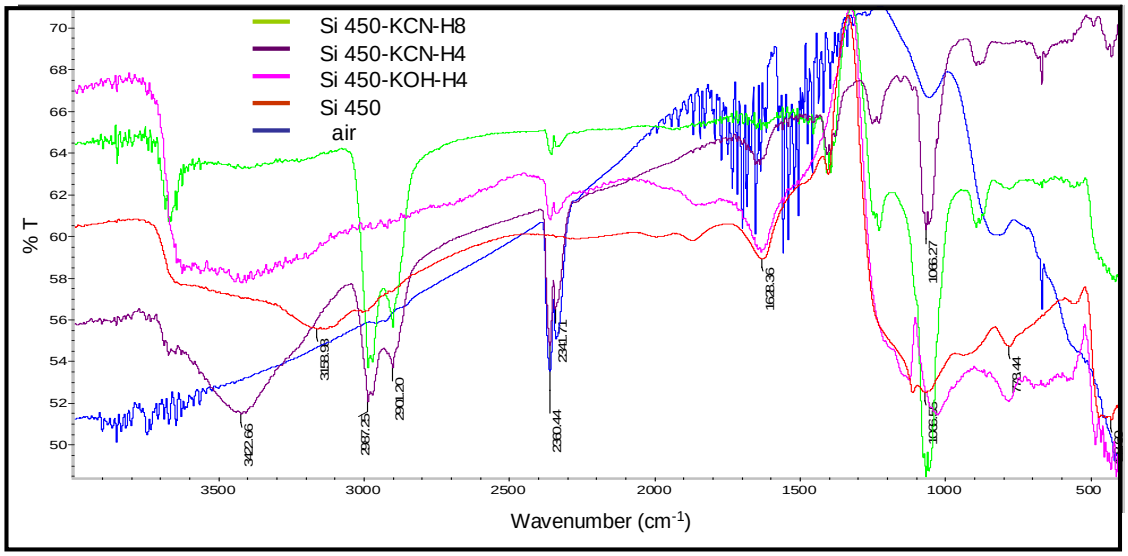

Figure S6. FT-IR spectra of silica microspheres of average diameter of 450 nm (**Si450**) before and after etching with KCN and KOH solution.