COMMUNICATION

Supplementary Material (ESI) for Chemical Communications

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Versatile Synthesis of Nanometer Sized Hollow Silica Spheres

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Supplementary Information

To synthesize the silica coated particles, the latex dispersions (2.4. to 2.6 w%) were injected into a 0.58 w% sodium silicate solution at pH = 9.7. The final concentrations ranged from 0.1 to 0.5 w% and the reaction mixtures were stirred for 24 hrs. To prevent precipation due to the drop in pH, the dispersions were diluted to twice the volume of the reaction mixture after which they were dialysed against water to remove the excess salts. In a typical experiment, the silica coated particles where transferred to CH_3CN by diluting 25 mL of a 0.1 w% aquous dispersion with CH_3CN (250 mL, after which all solvents were removed on a rotary evaporator untill 15 – 25 mL remained. To this dispersion CH_3CN (100 mL) was added and the volume was again reduced to 15 mL, this procedure was repeated twice. To the resulting water free dispersion, 1 mL 1,1,1,3,3,3-hexamethyldisilazane was added and the reaction mixture was stirred for 16 hrs. To this 35 mL MeOH was added and the precipitate was collected by centrifugation, washed 3 times by repetetive dispersion/centrifugation cycles in MeOH and air-dried, resulting in 22 mg of a white product. For TEM carbon coated formvar grids (Ted Palla Inc.) were used and for SEM silicon wafers.

IR spectra before and after calcination of coated polystyrene lattices with different diameters, measured in KBr pellets.

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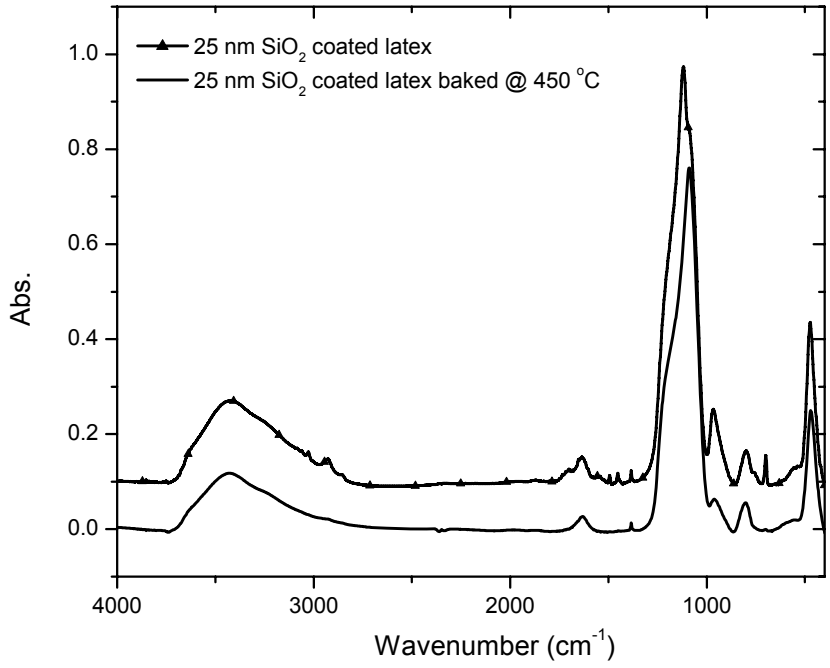

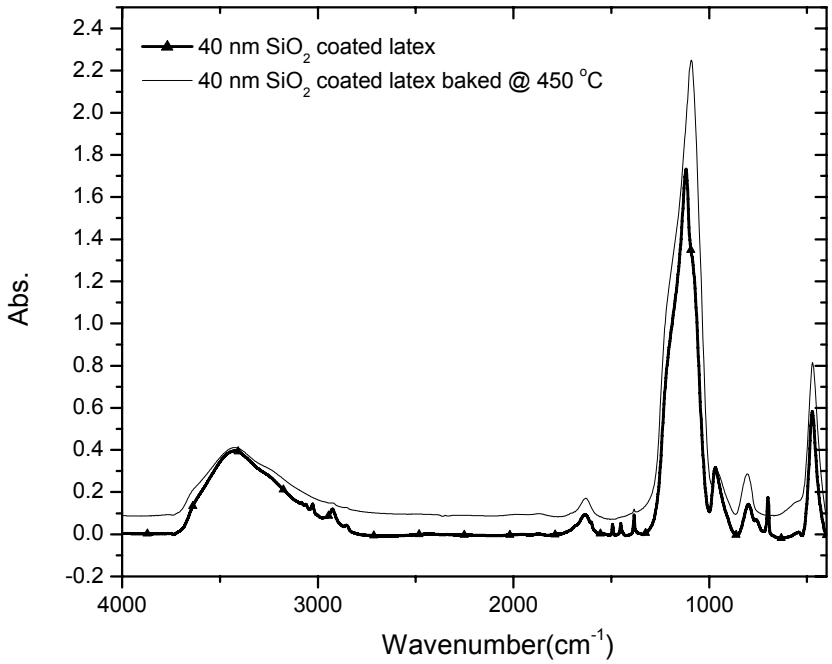

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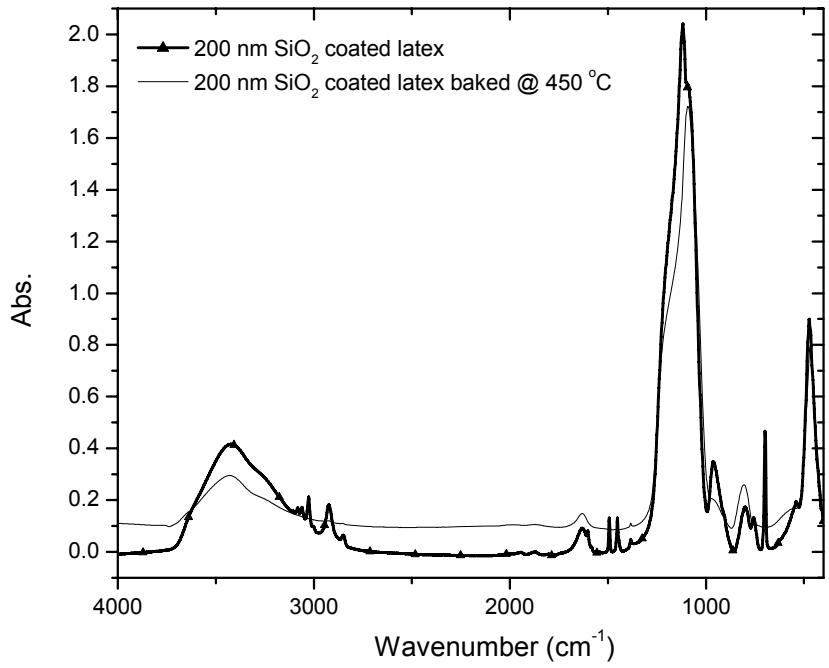

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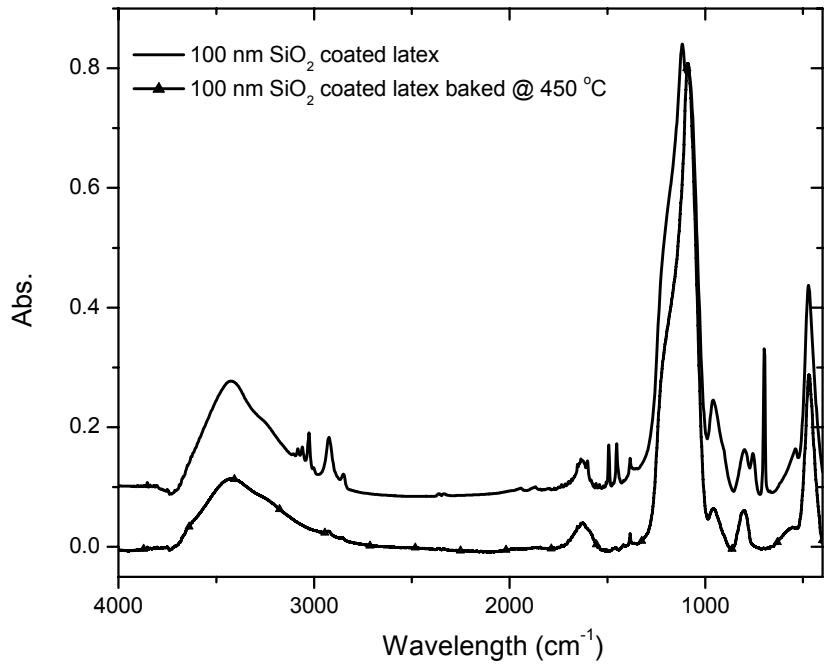

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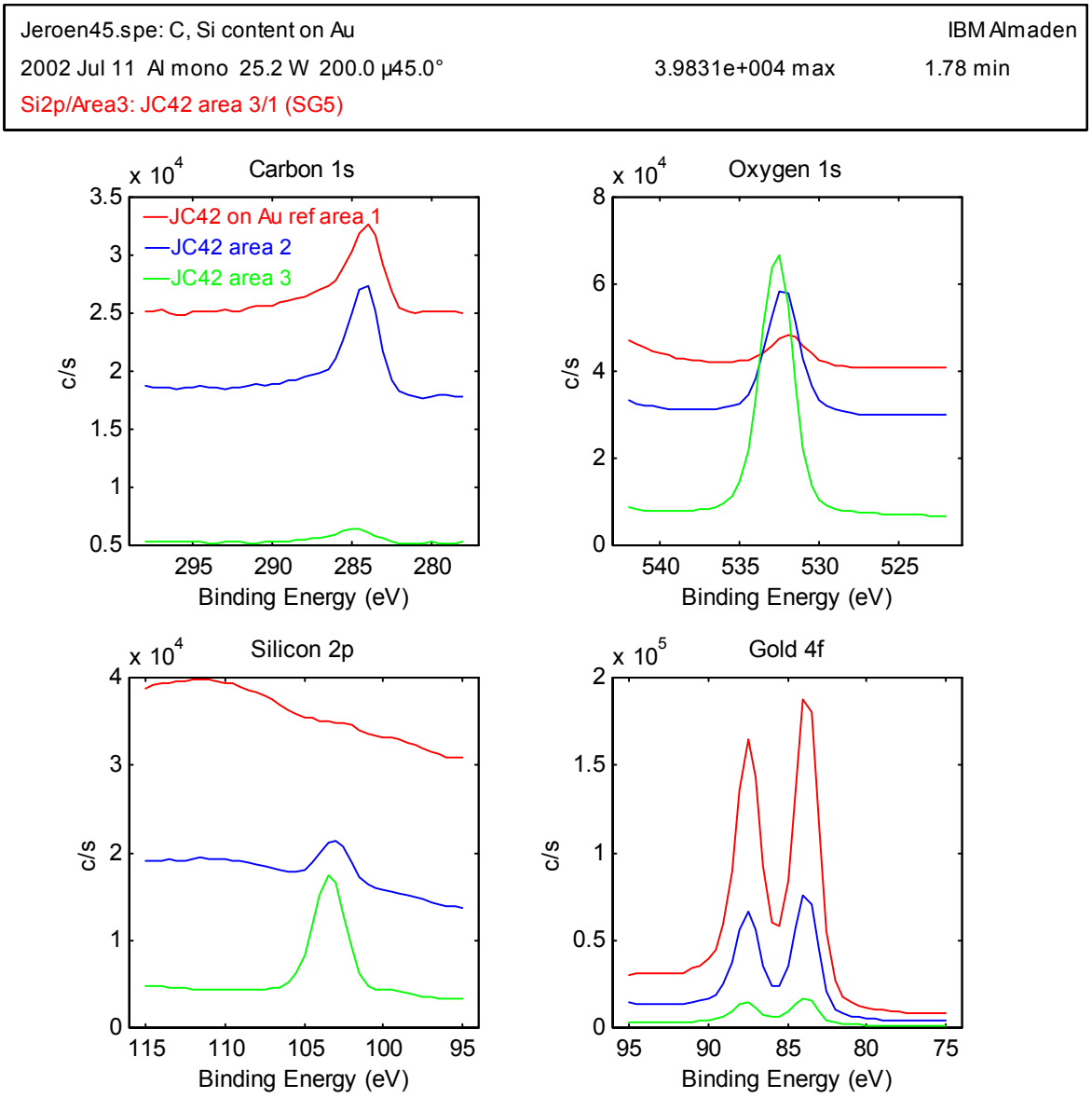
XPS measurements were carried out on drop-cast samples placed on gold-sputtered silicon wafers, the thickness of the gold layer was 350 nm.

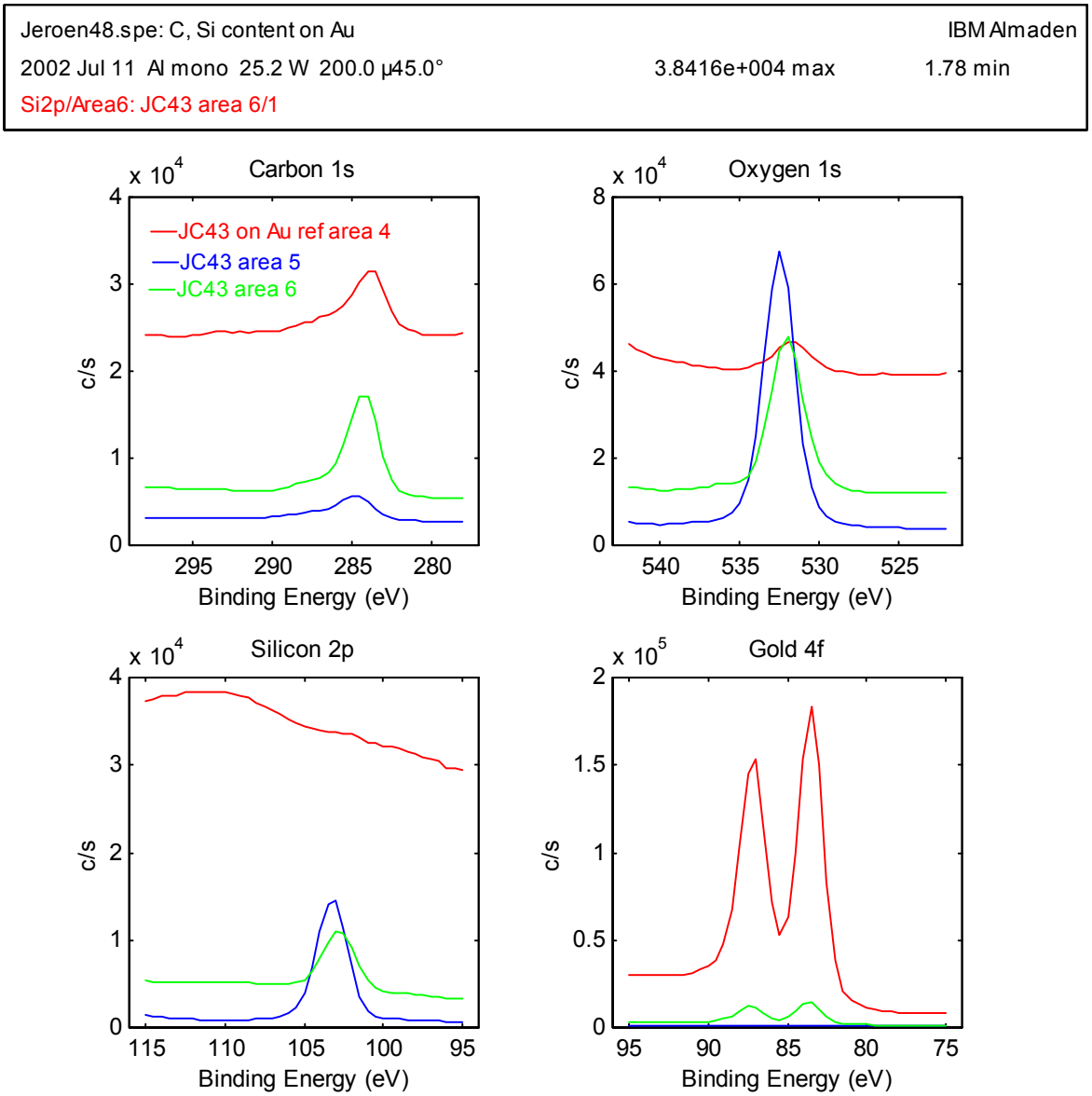
Atom concentration table:

	C1s	O1s	Si2p	Au4f	O/Si	C/Si
Au ref	41.3	13.9	0.0	44.8	na	na
25 nm	34.7	41.0	10.6	13.7	3.8	3.3
25 nm calcined	4.0	67.0	26.7	2.4	2.5	0.1
AU ref	41.6	13.1	0.0	45.3	na	na
40 nm	36.3	47.3	14.2	2.1	3.3	2.5
40 nm calcined	9.5	66.0	24.5	0.0	2.7	0.4
Au ref	43.1	15.1	0.0	41.7	na	na
100 nm	12.9	62.6	23.2	1.3	2.7	0.6
100 nm calcined	4.7	67.7	27.4	0.2	2.5	0.2
Au ref	38.2	14.1	0.0	47.8	na	na
200 nm	7.2	65.7	26.5	0.6	2.5	0.3
200 nm calcined	26.7	50.8	17.6	4.8	2.9	1.5

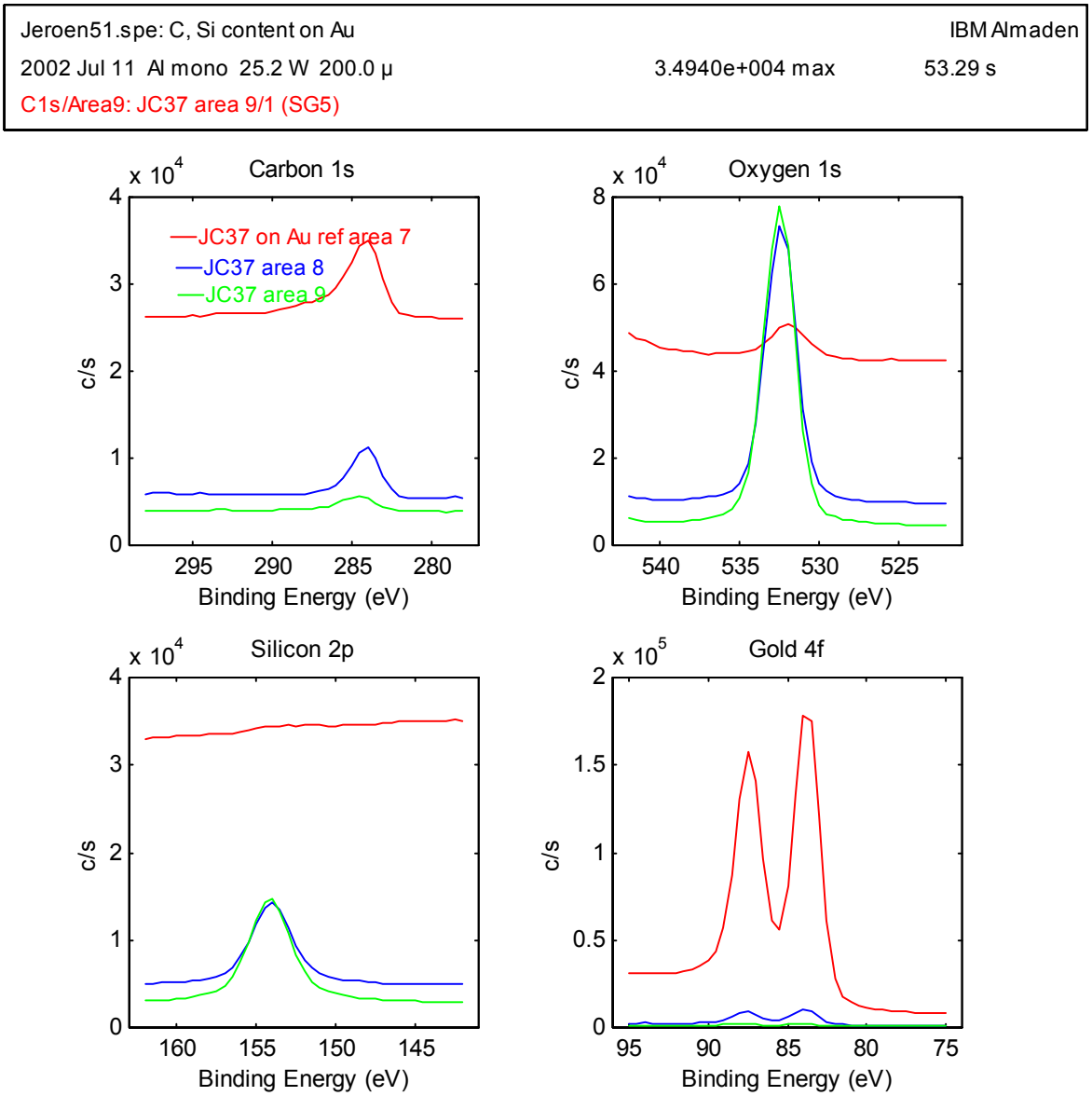
High resolution XPS of the 25 nm sample; red = reference, blue = coated; green = calcined



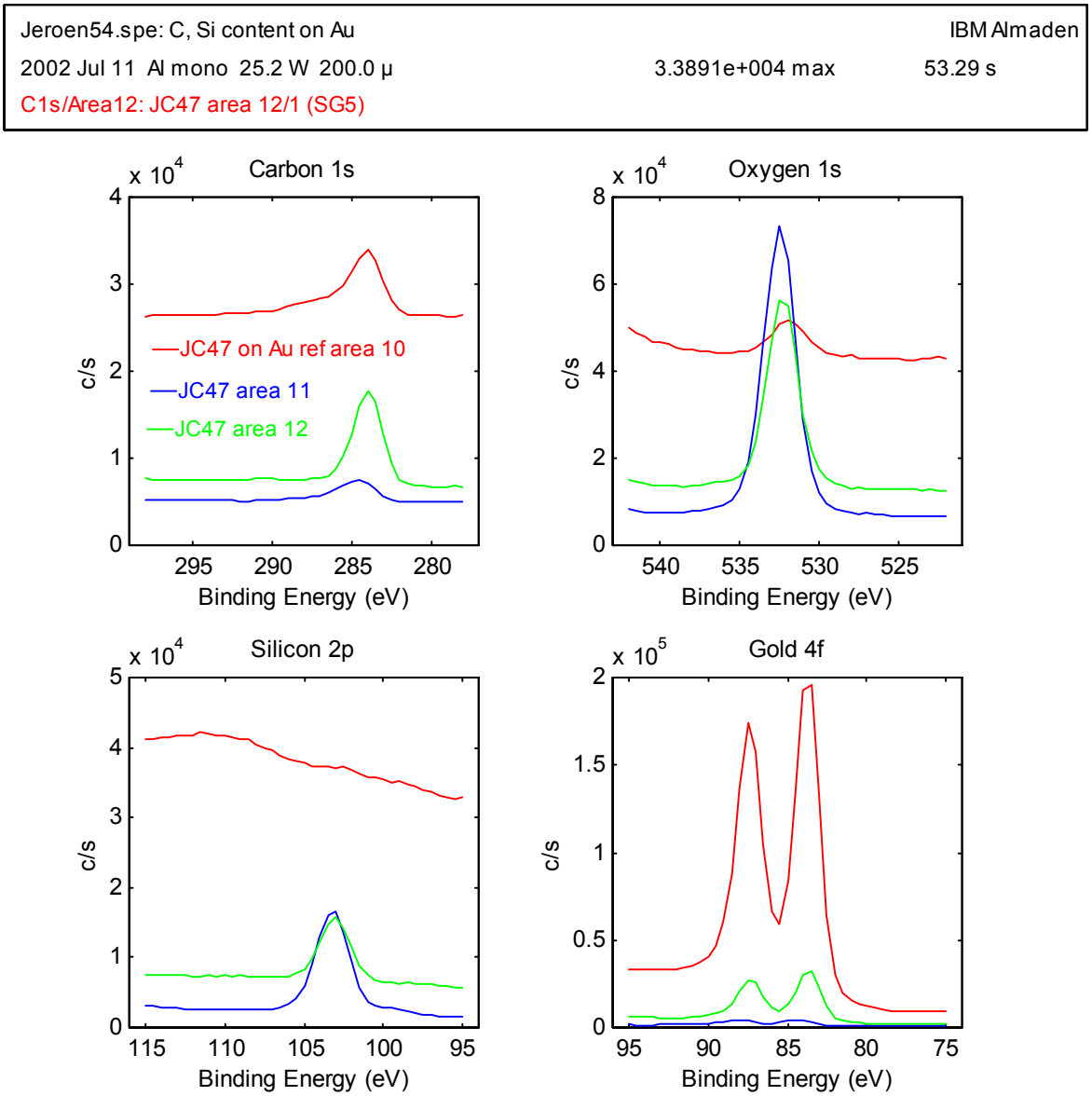
High resolution XPS of the 40 nm sample; red = reference, green = coated; blue= calcined



High resolution XPS of the 100 nm sample; red = reference, blue = coated; green = calcined



High resolution XPS of the 200 nm sample; red = reference, green = coated; blue = calcined



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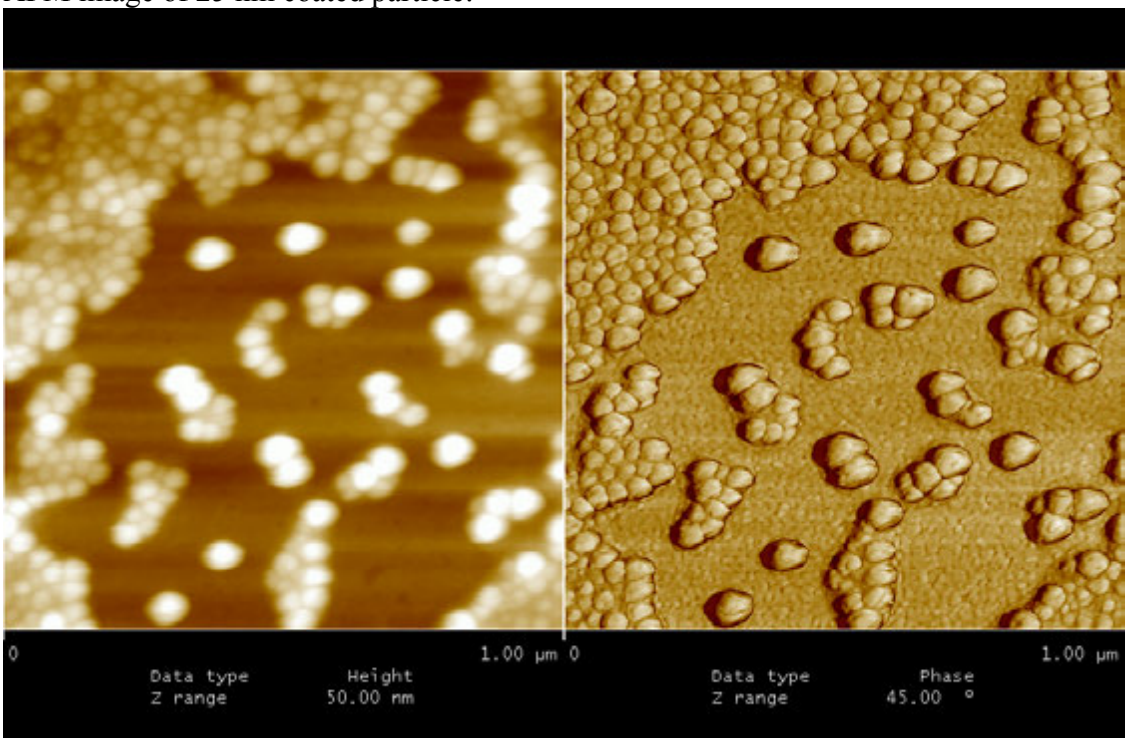
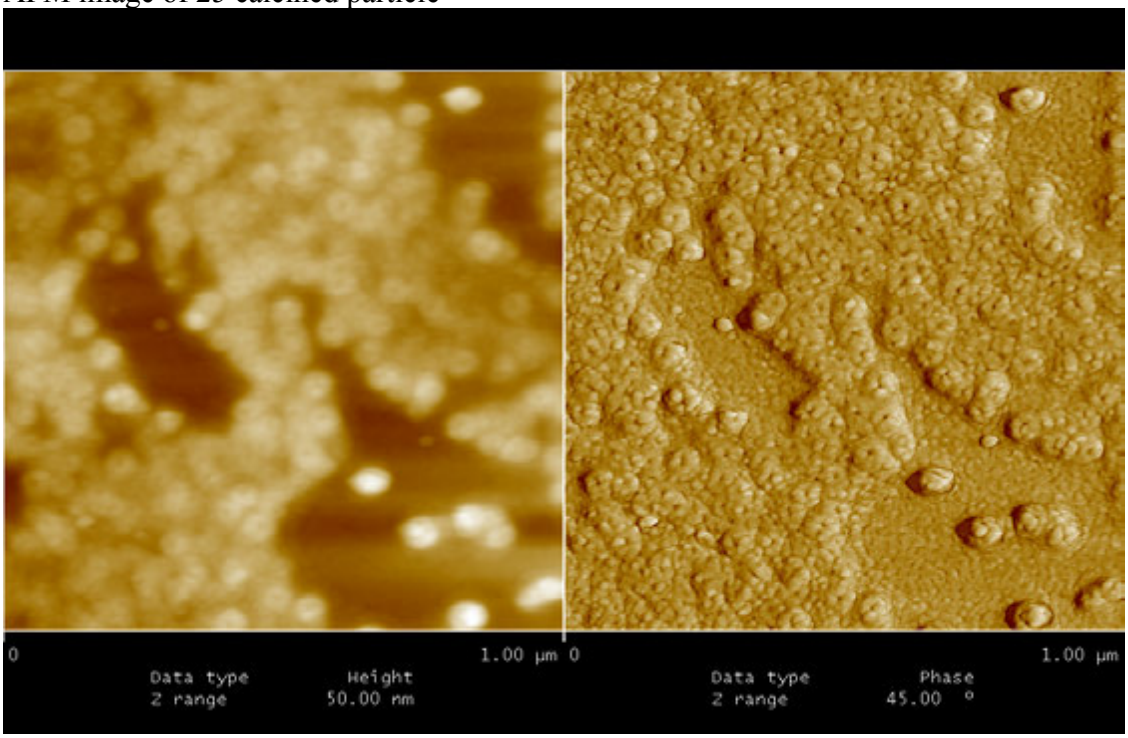
AFM image of 25 nm coated particle:



AFM image of 25 calcined particle



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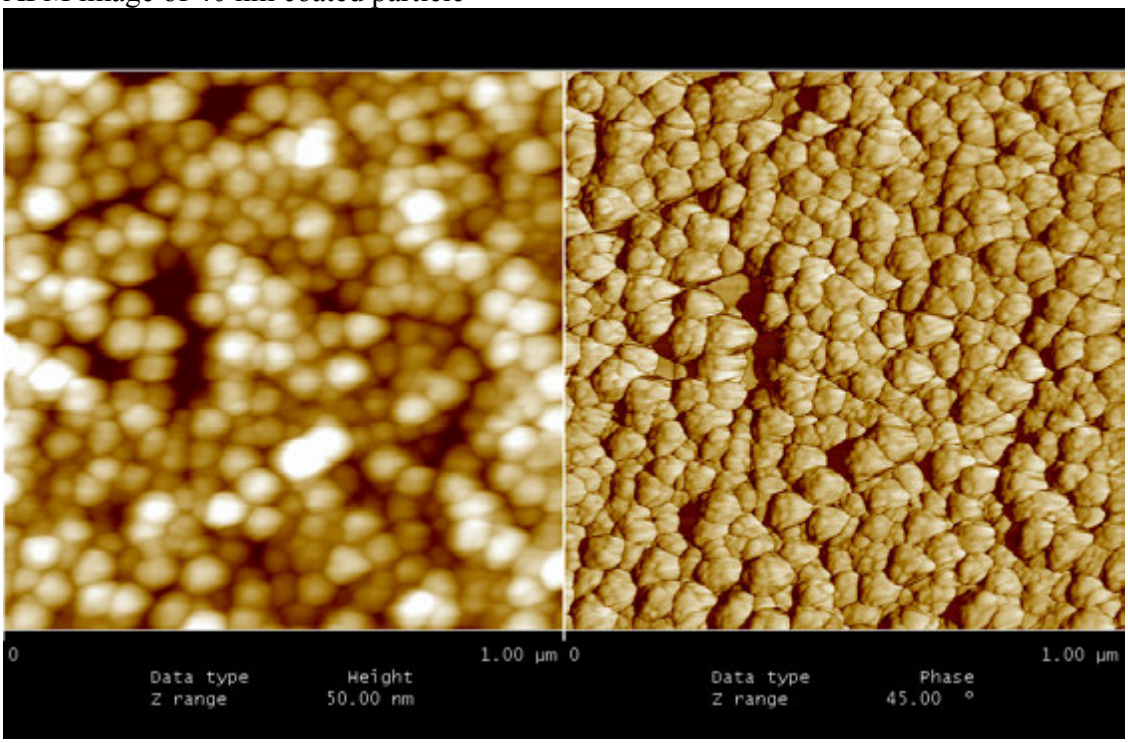
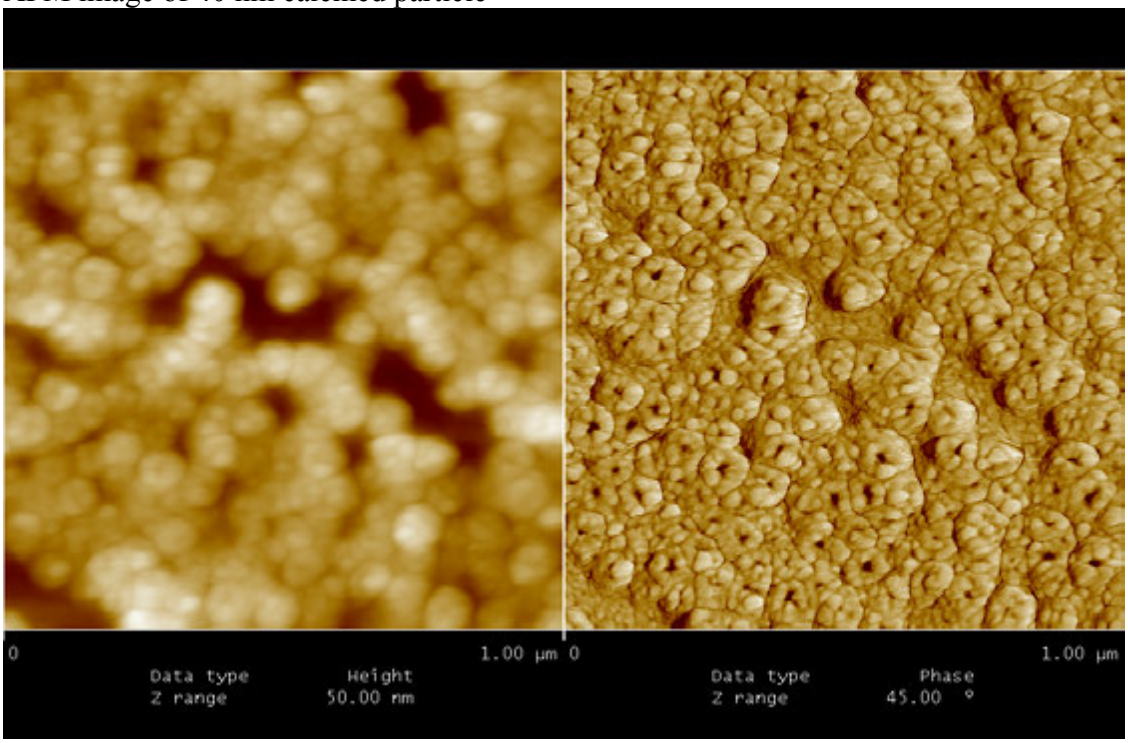
AFM image of 40 nm coated particle



AFM image of 40 nm calcined particle



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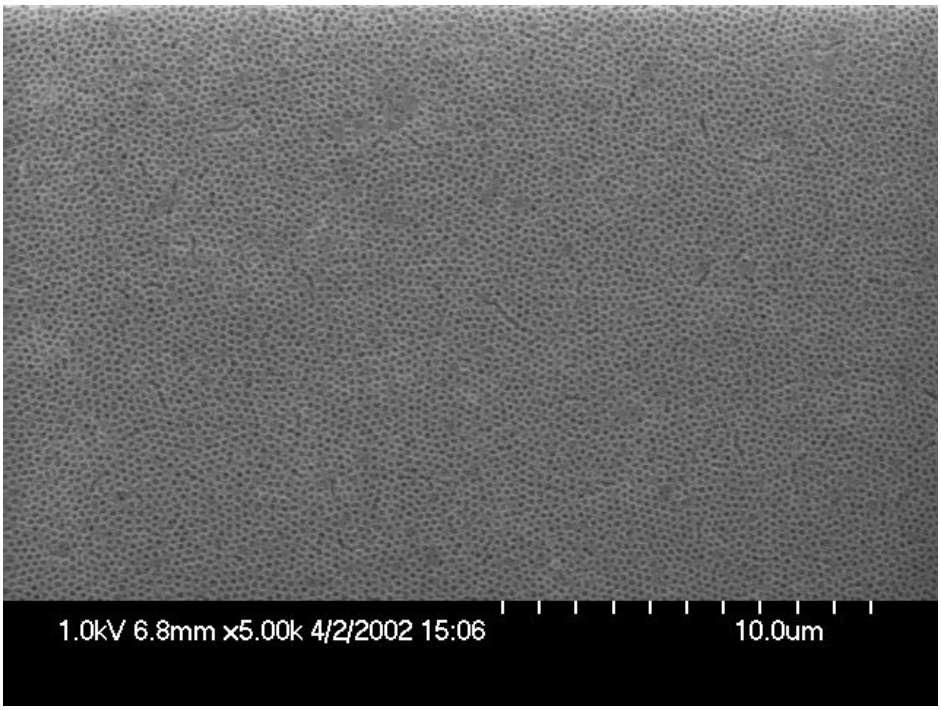
SEM image displaying the long range order in the slowly formed film of 200 nm coated spheres on a silicon wafer, after calcination.



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TEM image of SiO_2 coated polynorbornene-polyethyleneglycol star-shaped polymer. The detailed synthesis of the particles themselves will be published elsewhere (E.F. Connor *et al.* in preparation). For this particular sample a molecular weight of M_n = 37 kD was found, with a PDI = 1.4.