

# Long Chain Hydrosilanes Mediated Phase Transfer of Aqueous Metal Nanoparticles

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## Supplemental Information

**Materials:** All reagents are used as is from manufacturer with no further purification. Reactions were monitored for up to one week via UV-Vis spectroscopy to ensure complete reduction. All reactions are carried out under a vent hood and appropriate safety attire is worn at all times, including gloves, eye goggles, and lab coats.

**Characterization:** Transmission electron microscopy (TEM) photographs were obtained using a Hitachi HT7700 microscope operated at 100 kV accelerating voltage. The TEM samples were prepared by dropping the diluted nanoparticle solution in aqueous/organic solvent onto carbon-coated copper grids. The UV-vis spectra was measured at 25 °C using 10 mm optical path length quartz cuvettes. Fourier Transform infrared spectra (FT-IR) was recorded on a Bruker Vertex 70 Spectrometer. NMR measurements were performed at RT, using ~400  $\mu$ l of nanoparticle sample, with ~50  $\mu$ l  $\text{CDCl}_3$ .

### IR spectra of dried 2-AST Gold Nanoparticles

**IR Peaks:** 687  $\text{cm}^{-1}$  (m), 766  $\text{cm}^{-1}$  (m), 909  $\text{cm}^{-1}$  (m), 953  $\text{cm}^{-1}$  (m), 1010  $\text{cm}^{-1}$  (s), 1080  $\text{cm}^{-1}$  (m), 1199  $\text{cm}^{-1}$  (m), 1318  $\text{cm}^{-1}$  (m), 1351  $\text{cm}^{-1}$  (m), 1416  $\text{cm}^{-1}$  (m), 1468  $\text{cm}^{-1}$  (m), 1569  $\text{cm}^{-1}$  (m), 1645  $\text{cm}^{-1}$  (m), 2114  $\text{cm}^{-1}$  (w), 2812  $\text{cm}^{-1}$  (m), 2886  $\text{cm}^{-1}$  (m), 2931  $\text{cm}^{-1}$  (m), 3341  $\text{cm}^{-1}$  (m)

### IR Spectra of dried 2-AST

**IR Peaks:** 686.29  $\text{cm}^{-1}$  (m), 767.89  $\text{cm}^{-1}$  (m), 917.86  $\text{cm}^{-1}$  (m), 1016.02  $\text{cm}^{-1}$  (s), 1099.96  $\text{cm}^{-1}$  (m), 1309.87  $\text{cm}^{-1}$  (m), 1412.01  $\text{cm}^{-1}$  (m), 1473.39  $\text{cm}^{-1}$  (m), 1571.26  $\text{cm}^{-1}$  (m), 1649.37  $\text{cm}^{-1}$  (m), 2864.79  $\text{cm}^{-1}$  (m), 2920.91  $\text{cm}^{-1}$  (m), 3272.10  $\text{cm}^{-1}$  (m), 3342.53  $\text{cm}^{-1}$  (m)

### IR Spectra of the dried aqueous layer after the phase transfer reaction with n-butylsilane.

**IR Peaks:** 689.69  $\text{cm}^{-1}$  (m), 778.57  $\text{cm}^{-1}$  (m), 897.96  $\text{cm}^{-1}$  (m), 1024.85  $\text{cm}^{-1}$  (s), 1100.55  $\text{cm}^{-1}$  (m), 1203.61  $\text{cm}^{-1}$  (m), 1408.63  $\text{cm}^{-1}$  (w), 1458.31  $\text{cm}^{-1}$  (w), 1591.27  $\text{cm}^{-1}$  (w), 1661.98  $\text{cm}^{-1}$  (w), 2860.43  $\text{cm}^{-1}$  (m), 2925.99  $\text{cm}^{-1}$  (m), 2955.99  $\text{cm}^{-1}$  (m), 3340.48  $\text{cm}^{-1}$  (m)

### IR Spectra n-butylsilane

**IR Peaks:** 614.06  $\text{cm}^{-1}$  (s), 689.38  $\text{cm}^{-1}$  (s), 718.88  $\text{cm}^{-1}$  (s), 745.56  $\text{cm}^{-1}$  (s), 772.14  $\text{cm}^{-1}$  (s), 789.68  $\text{cm}^{-1}$  (s), 887.55  $\text{cm}^{-1}$  (s), 920.32  $\text{cm}^{-1}$  (s), 1029.11  $\text{cm}^{-1}$  (s), 1084.01  $\text{cm}^{-1}$  (s), 1110.24  $\text{cm}^{-1}$  (s), 1191.57  $\text{cm}^{-1}$  (s), 1296.70  $\text{cm}^{-1}$  (s), 1341.74  $\text{cm}^{-1}$  (s), 1378.19  $\text{cm}^{-1}$  (s), 1404.06  $\text{cm}^{-1}$  (s), 1458.25  $\text{cm}^{-1}$  (s), 2146.53  $\text{cm}^{-1}$  (m), 2858.87  $\text{cm}^{-1}$  (m), 2874.34  $\text{cm}^{-1}$  (m), 2924.33  $\text{cm}^{-1}$  (m), 2959.38  $\text{cm}^{-1}$  (m)

### n-butylsilane stabilized Gold Nanoparticles

**IR Peaks:** 689.19  $\text{cm}^{-1}$  (m), 732.04  $\text{cm}^{-1}$  (m), 751.77  $\text{cm}^{-1}$  (m), 797.04  $\text{cm}^{-1}$  (m), 840.21  $\text{cm}^{-1}$  (m), 853.50  $\text{cm}^{-1}$  (m), 882.22  $\text{cm}^{-1}$  (m), 893.50  $\text{cm}^{-1}$  (m), 963.38  $\text{cm}^{-1}$  (m), 1018.25  $\text{cm}^{-1}$  (s), 1071.05  $\text{cm}^{-1}$  (s), 1095.28  $\text{cm}^{-1}$  (s), 1202.57  $\text{cm}^{-1}$  (m), 1272.47  $\text{cm}^{-1}$  (w), 1301.22  $\text{cm}^{-1}$  (w), 1344.38  $\text{cm}^{-1}$  (w), 1377.54  $\text{cm}^{-1}$  (w), 1407.40  $\text{cm}^{-1}$  (w), 1465.12  $\text{cm}^{-1}$  (w), 2156.45  $\text{cm}^{-1}$  (w), 2860.01  $\text{cm}^{-1}$  (m), 2872.82  $\text{cm}^{-1}$  (m), 2925.38  $\text{cm}^{-1}$  (m), 2956.80  $\text{cm}^{-1}$  (m)

### IR Spectra of ODS stabilized Gold Nanoparticles

**IR peaks:** 720.51  $\text{cm}^{-1}$  (m), 885.80  $\text{cm}^{-1}$  (m), 1075.10  $\text{cm}^{-1}$  (m), 1260.06  $\text{cm}^{-1}$  (w), 1467.52  $\text{cm}^{-1}$  (m), 2164.42  $\text{cm}^{-1}$  (w), 2848.90  $\text{cm}^{-1}$  (s), 2915.74  $\text{cm}^{-1}$  (s)

**Figure S1:** HNMR of n-butylsilane.

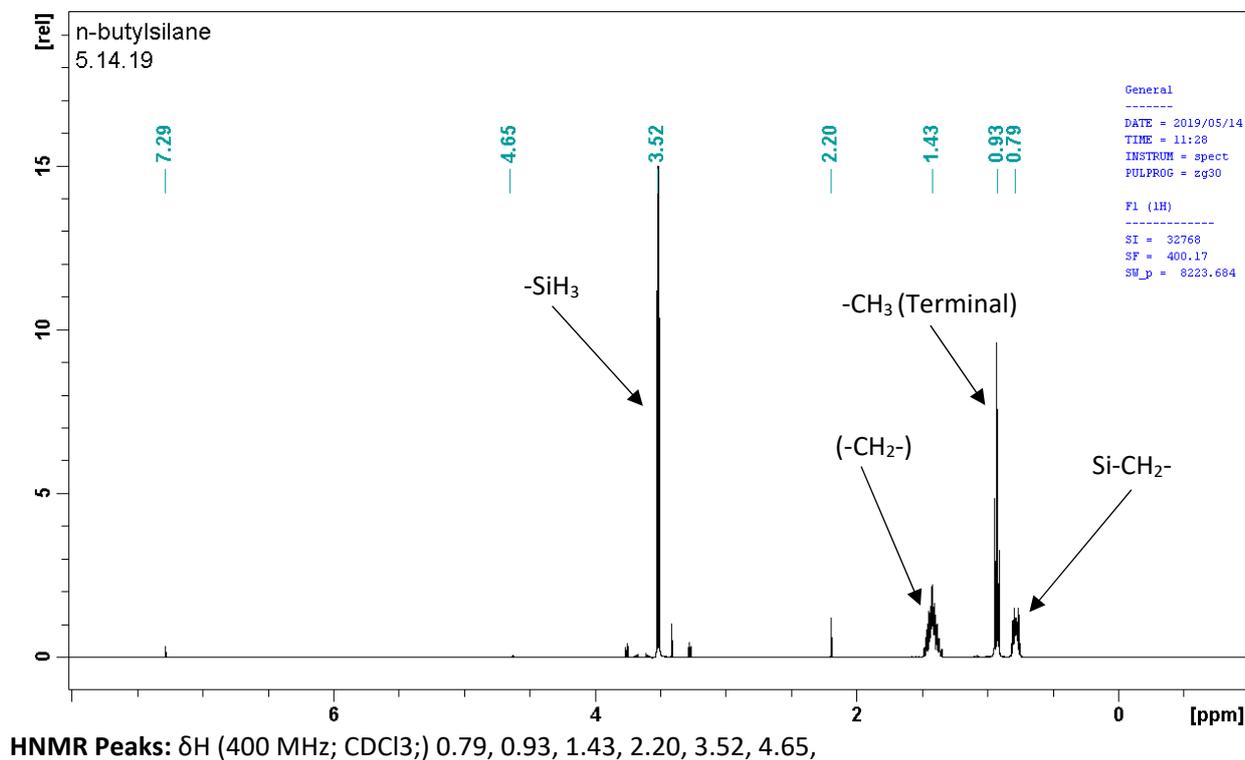
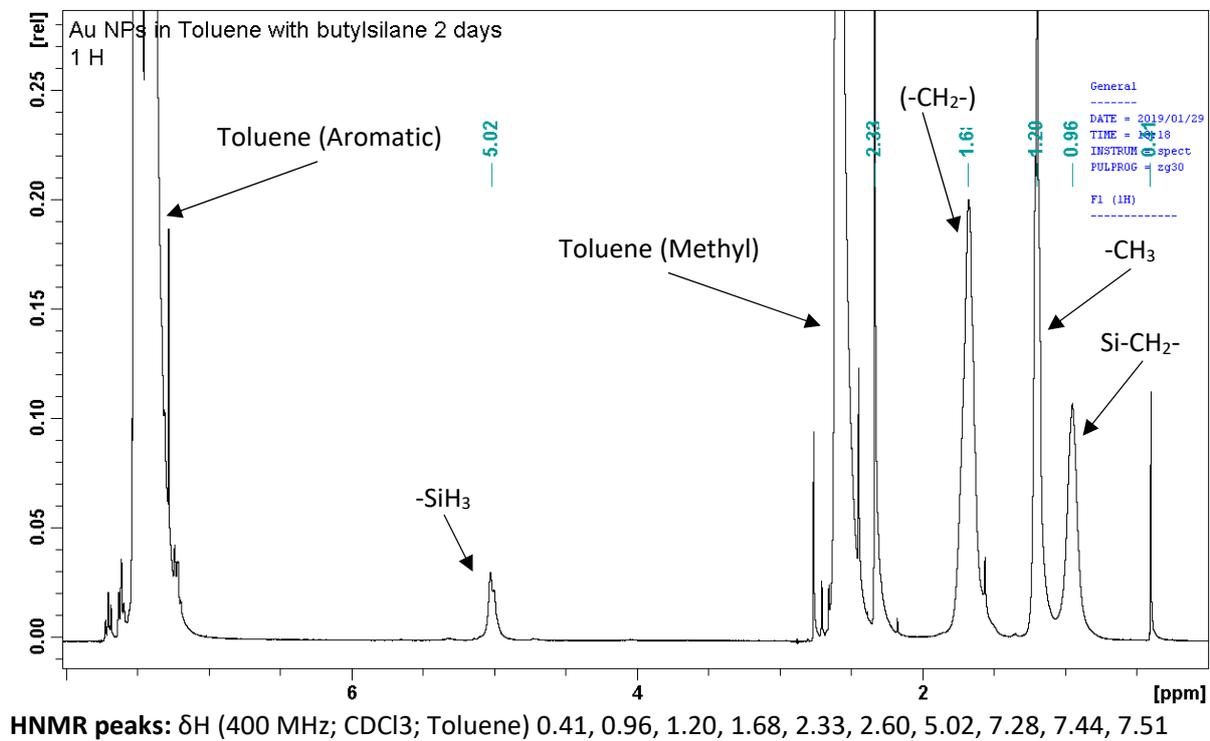
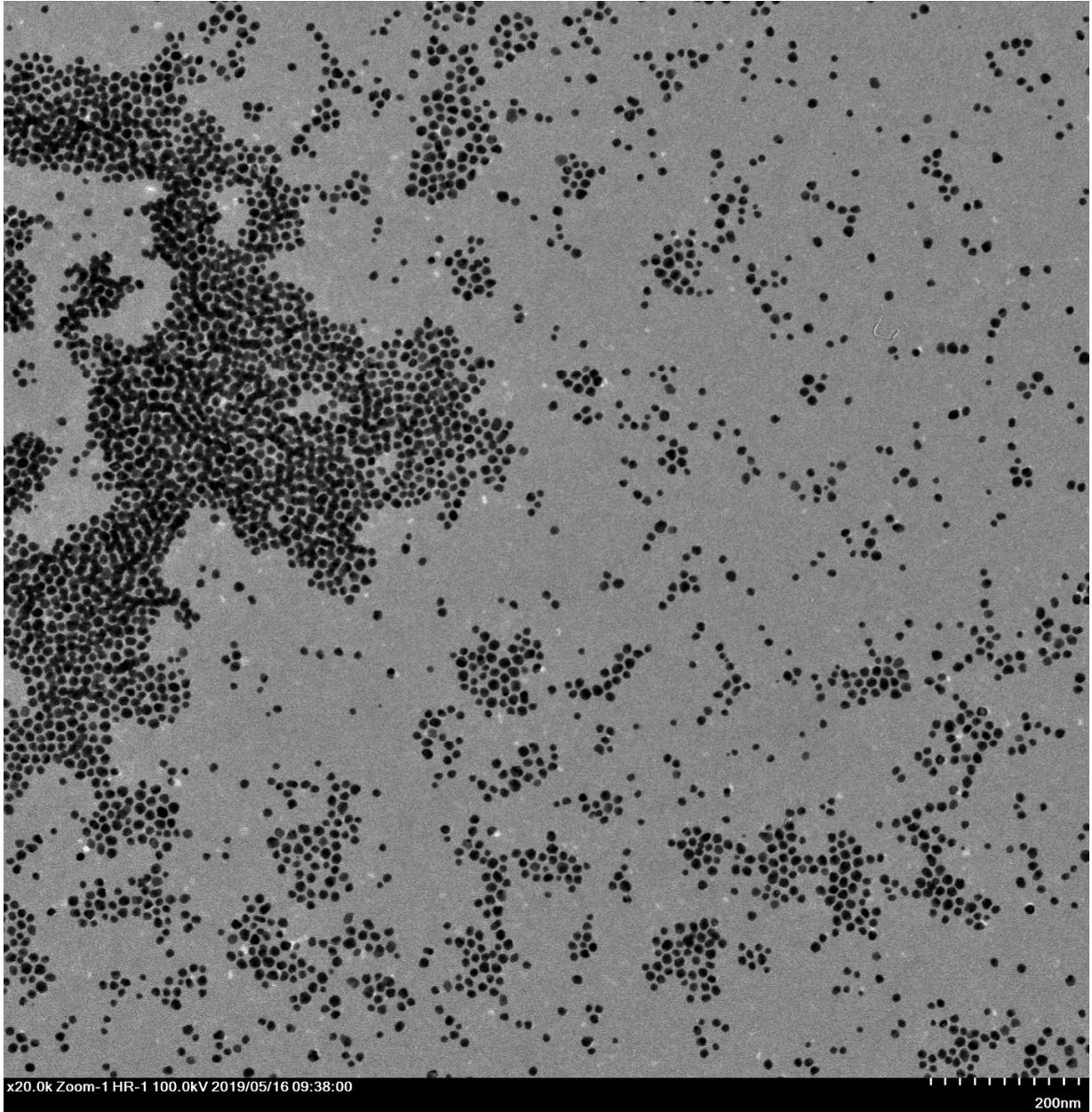


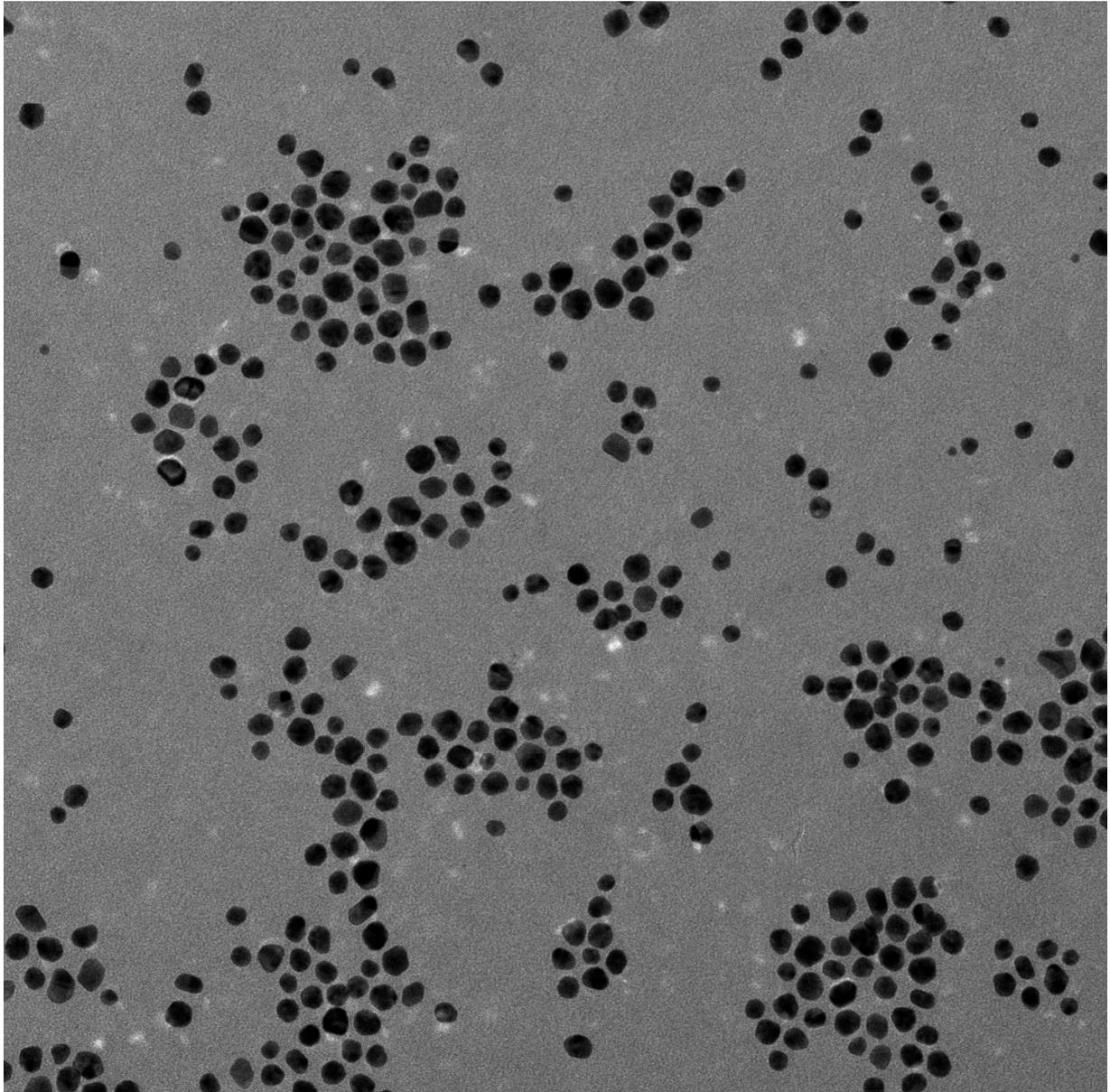
Figure S2: Butylsilane stabilized Gold Nanoparticles in Toluene.



TEM Images:

2-AST Gold Nanoparticles in Water:

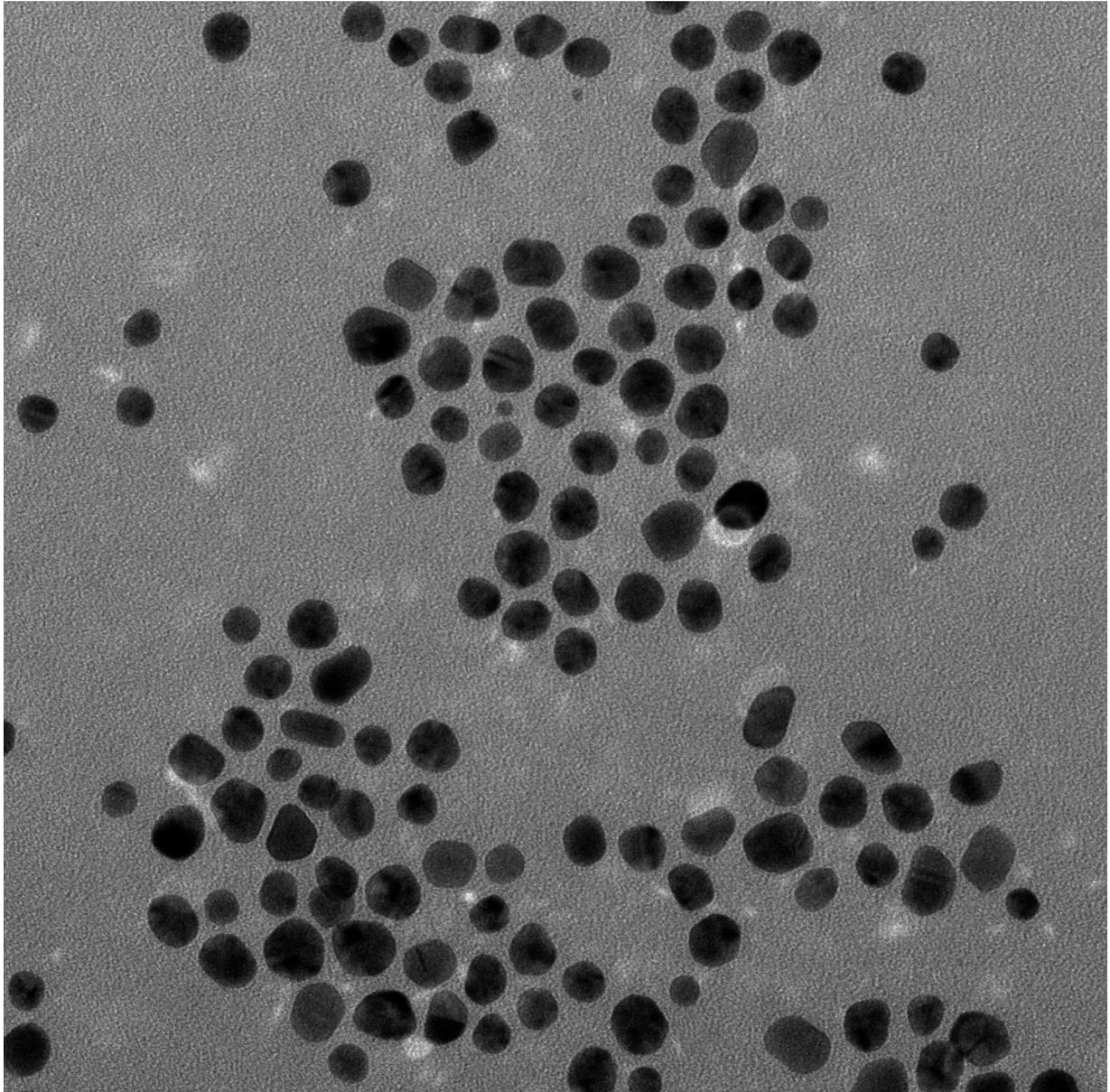




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100nm

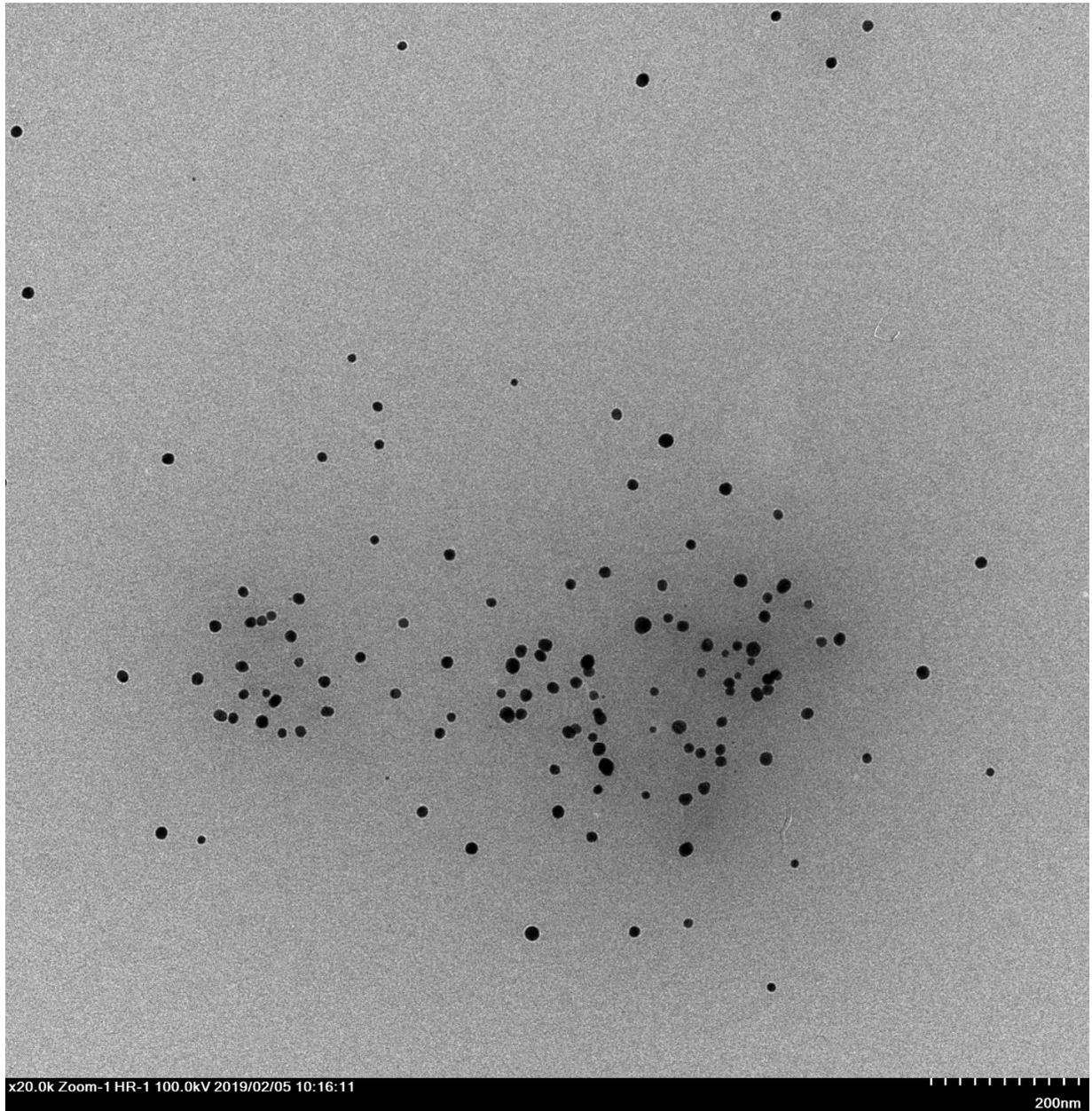


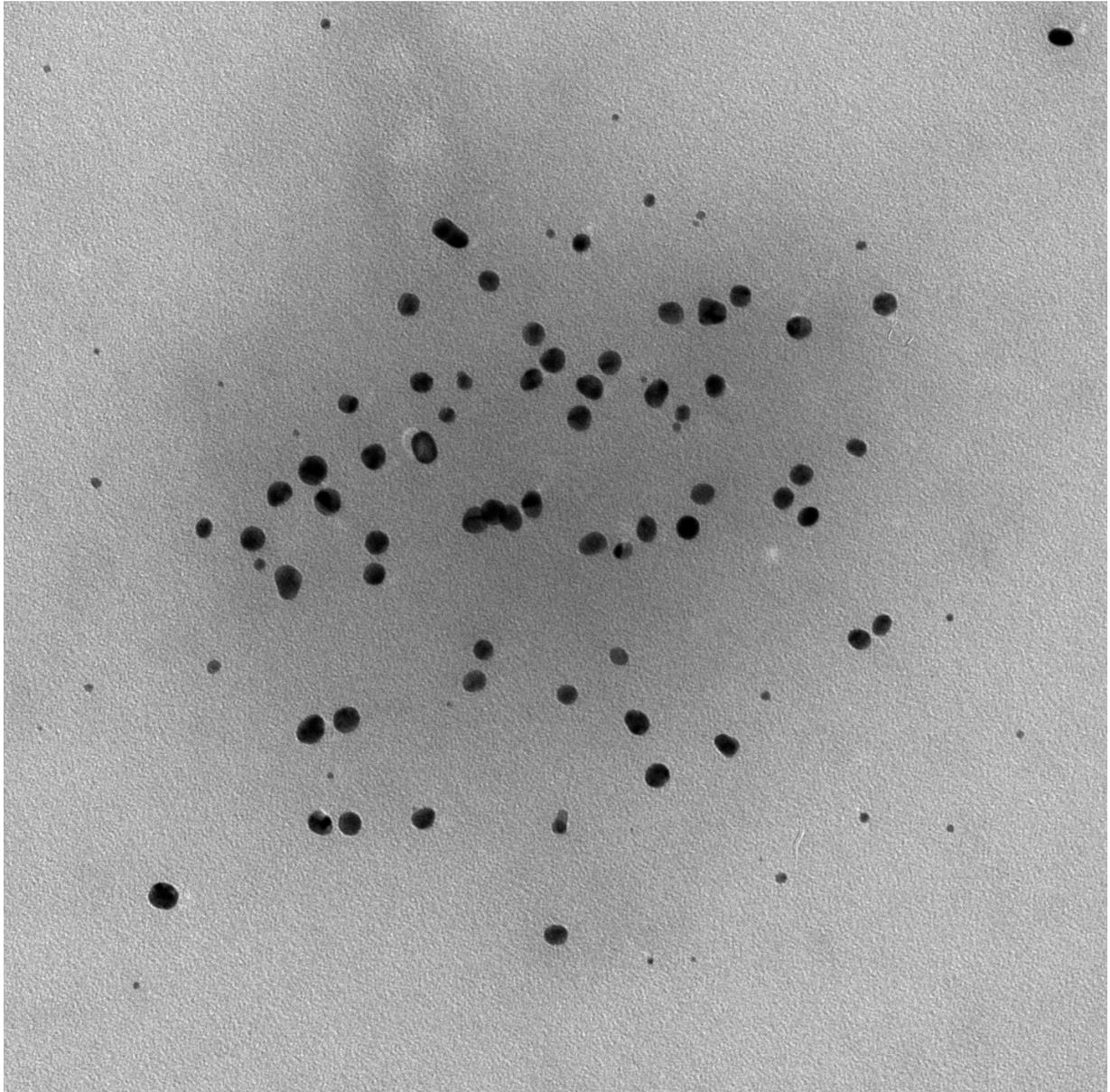
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50nm

**Butylsilane Stabilized Nanoparticles in Toluene:**



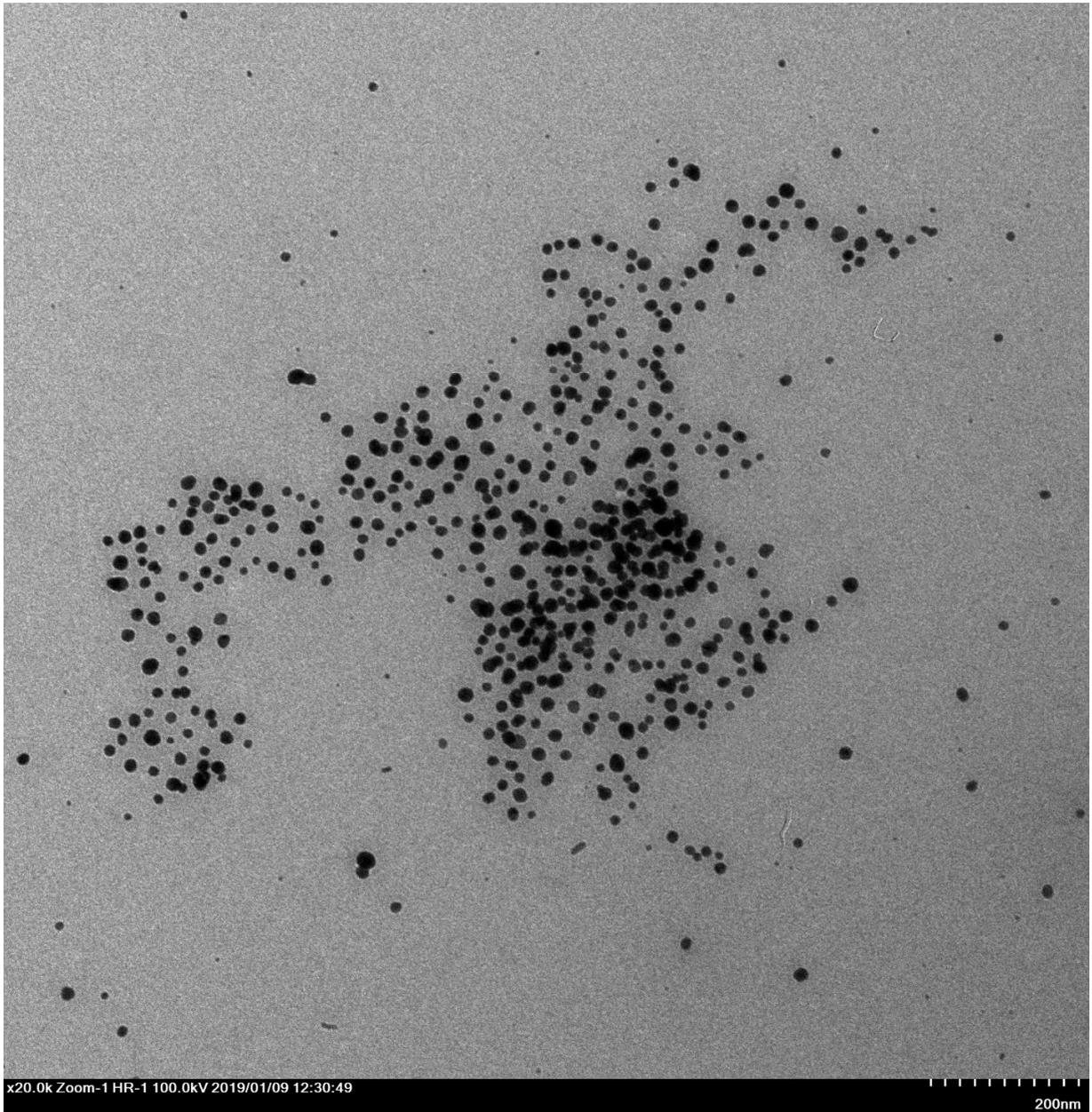


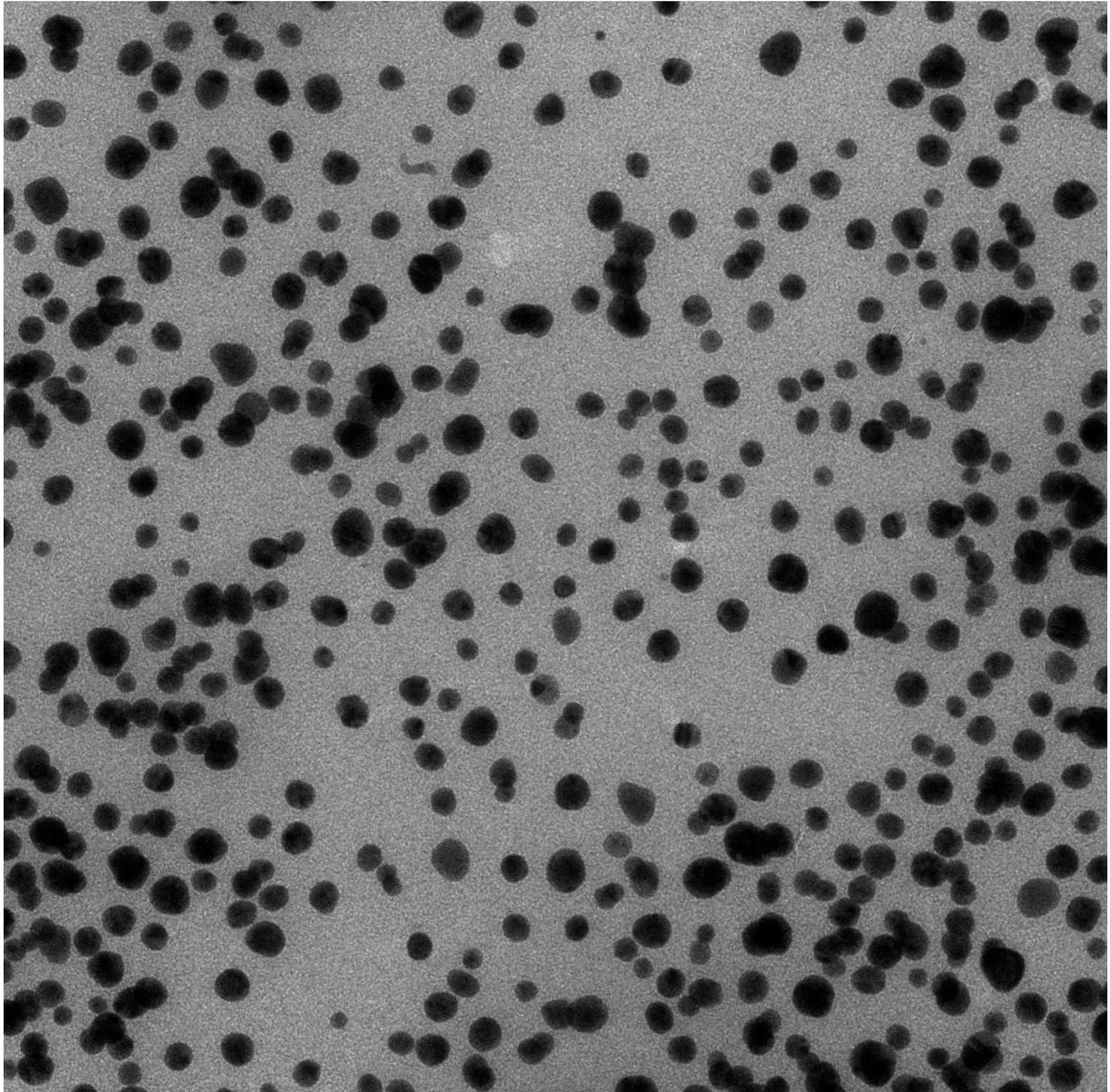
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100nm

Hexylsilane Stabilized Nanoparticles in Toluene:

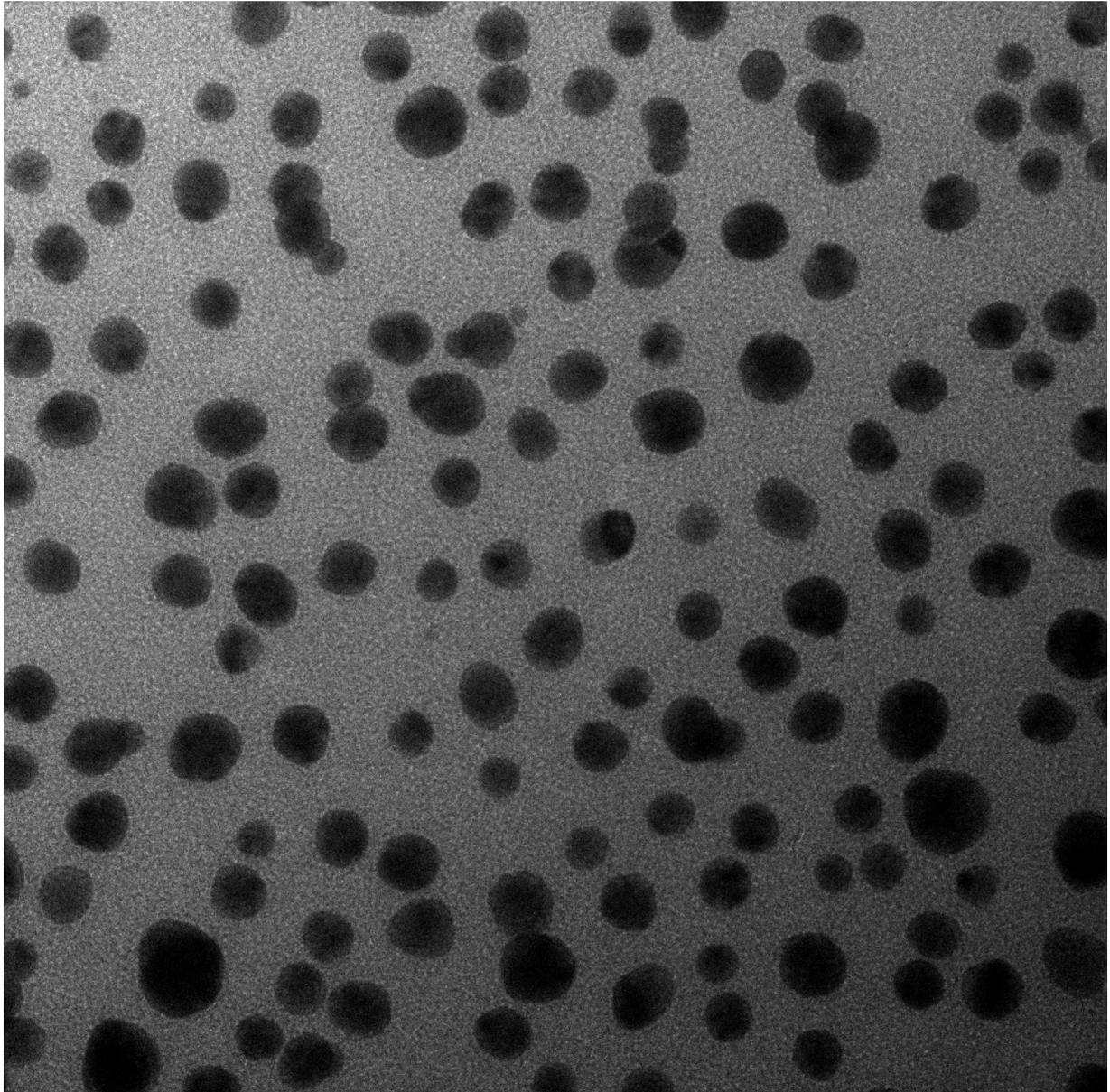




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100nm

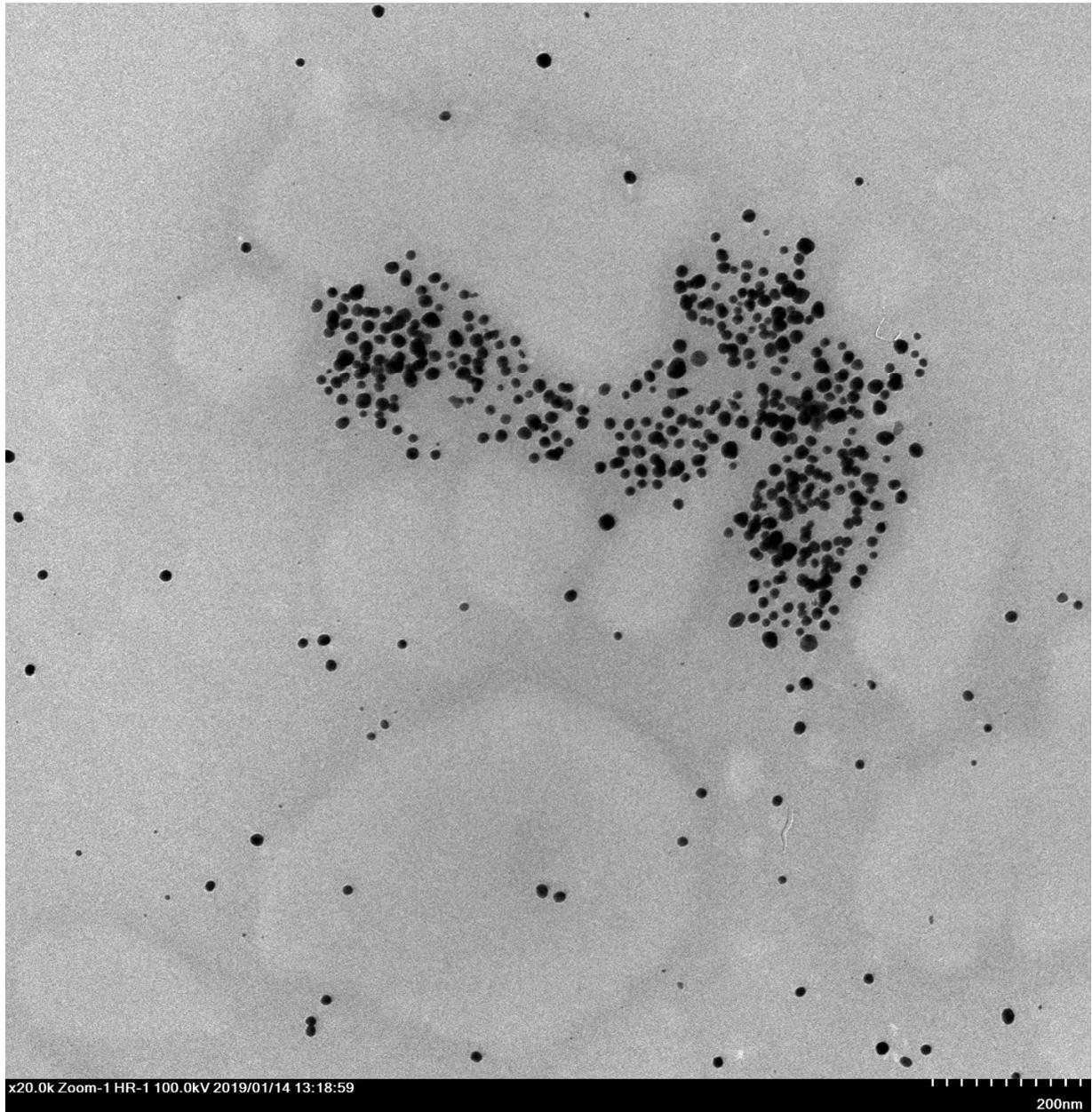


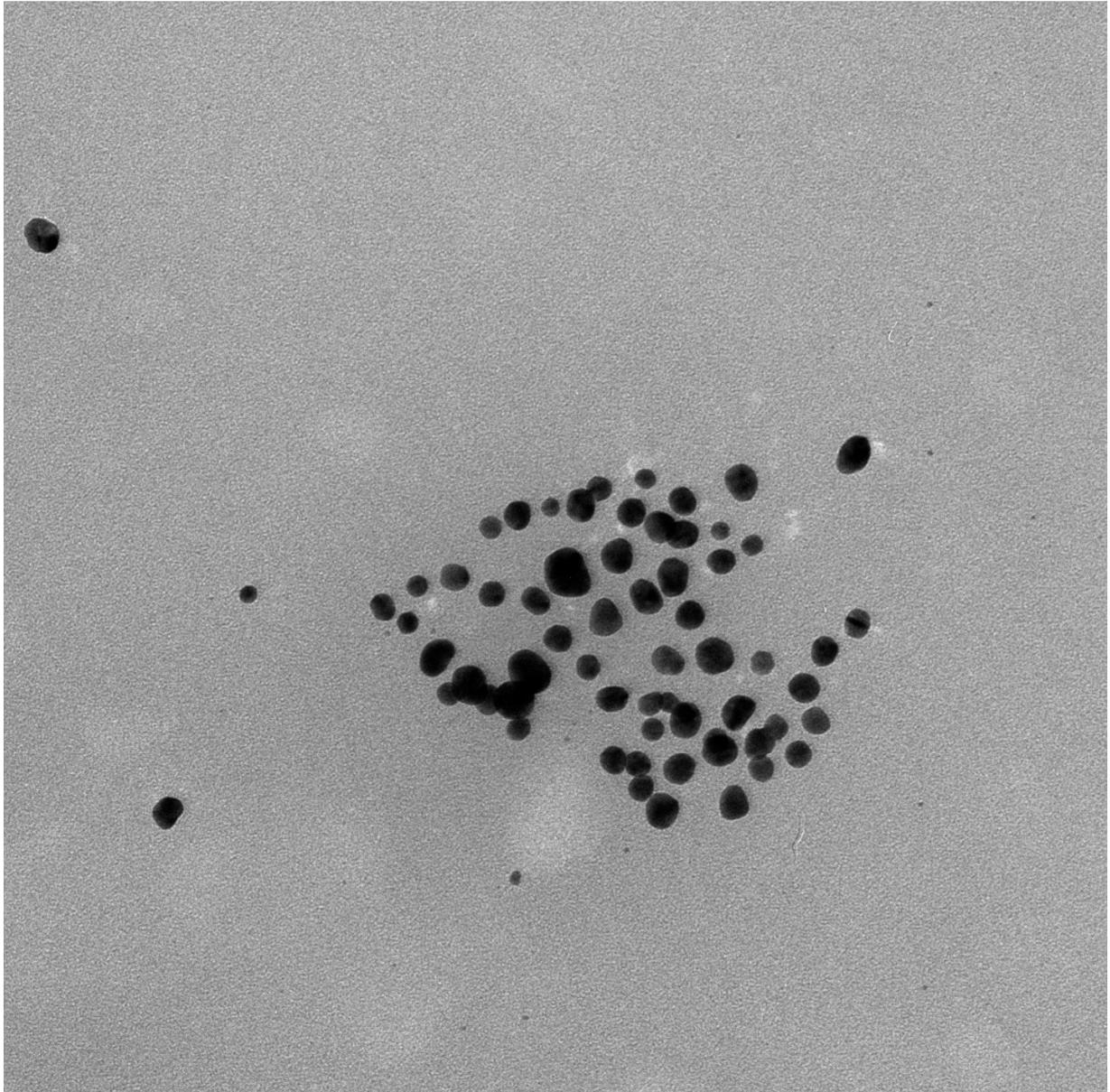
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50nm

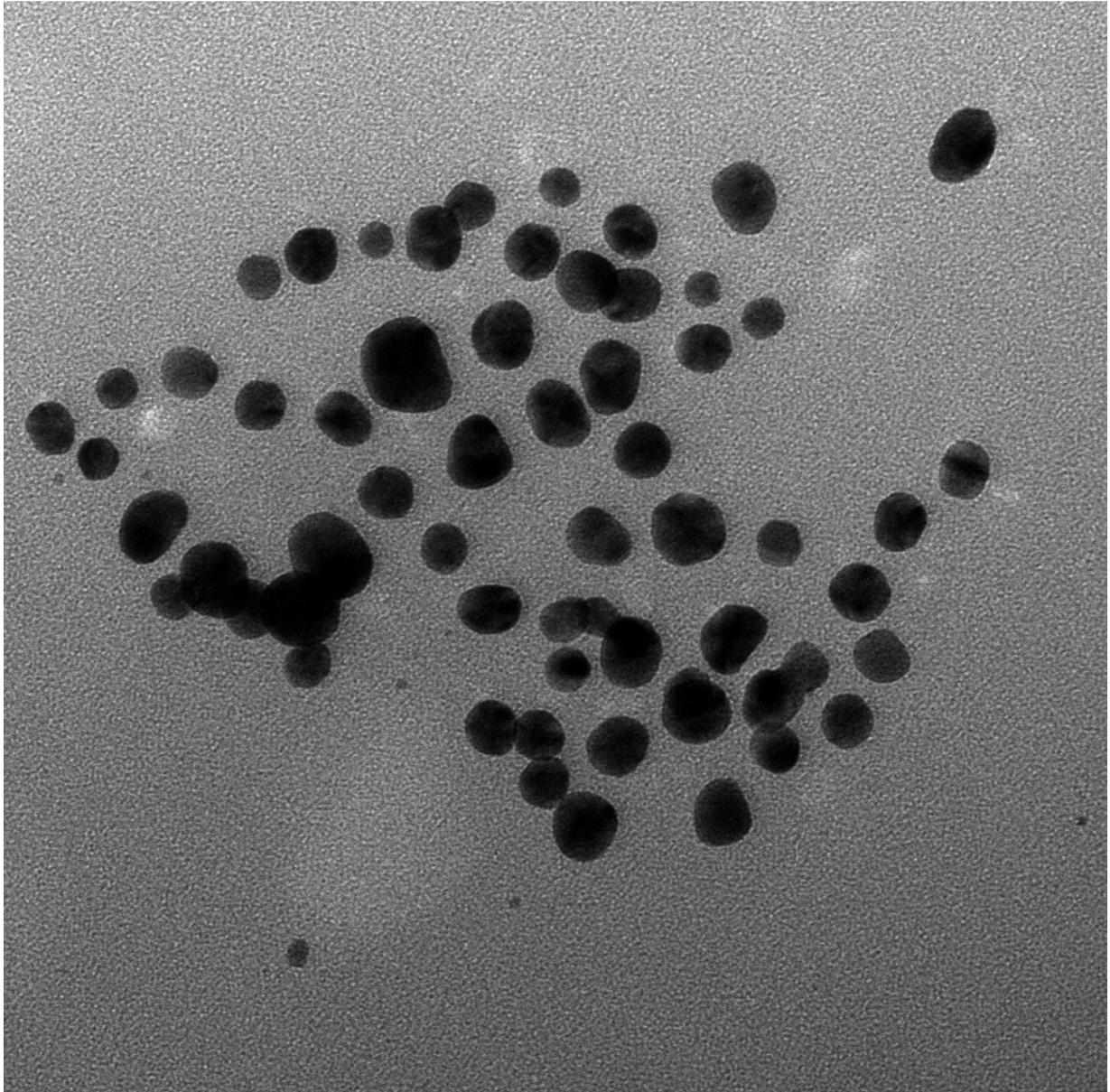
Octylsilane Stabilized Nanoparticles in Toluene:





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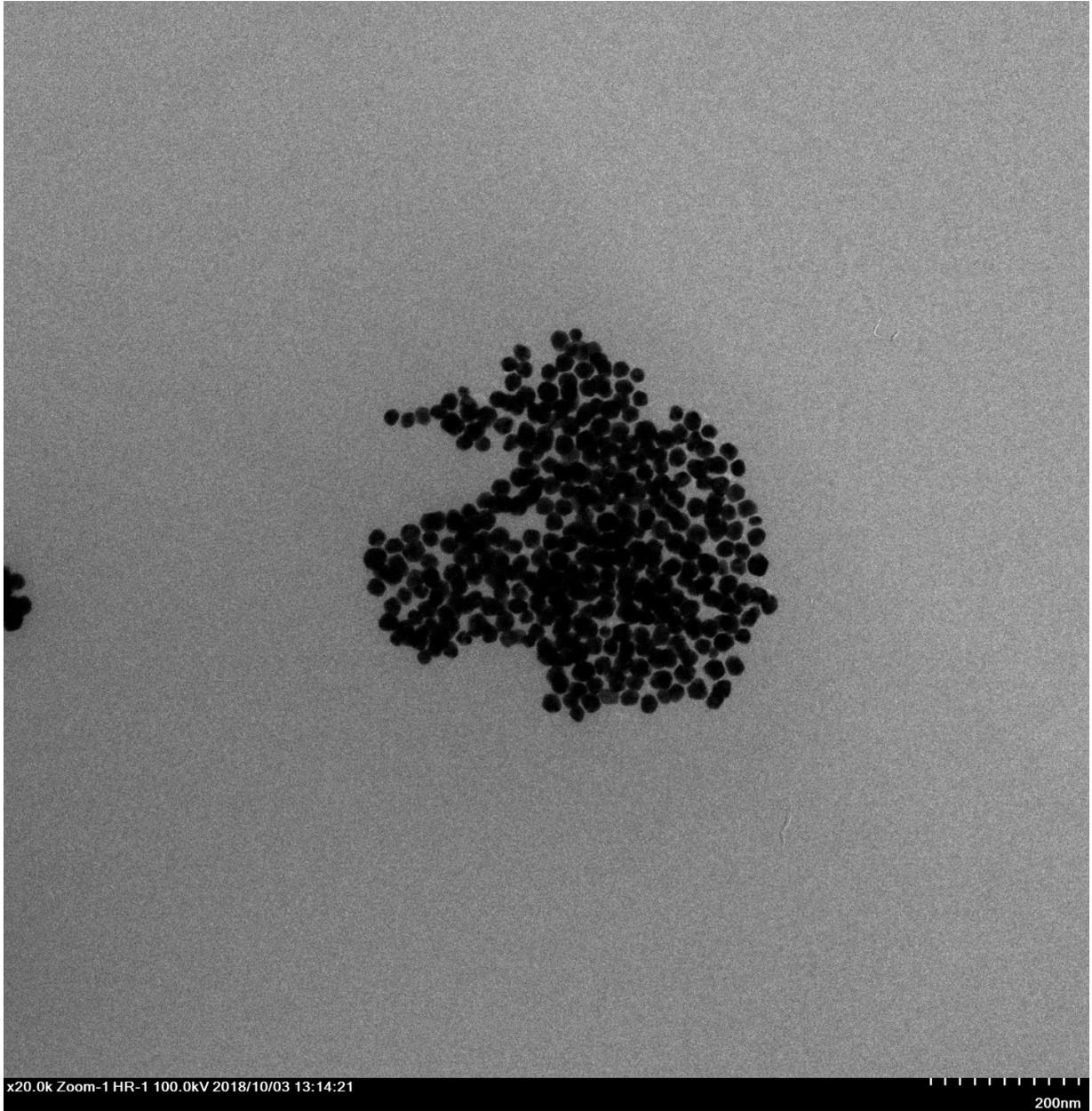


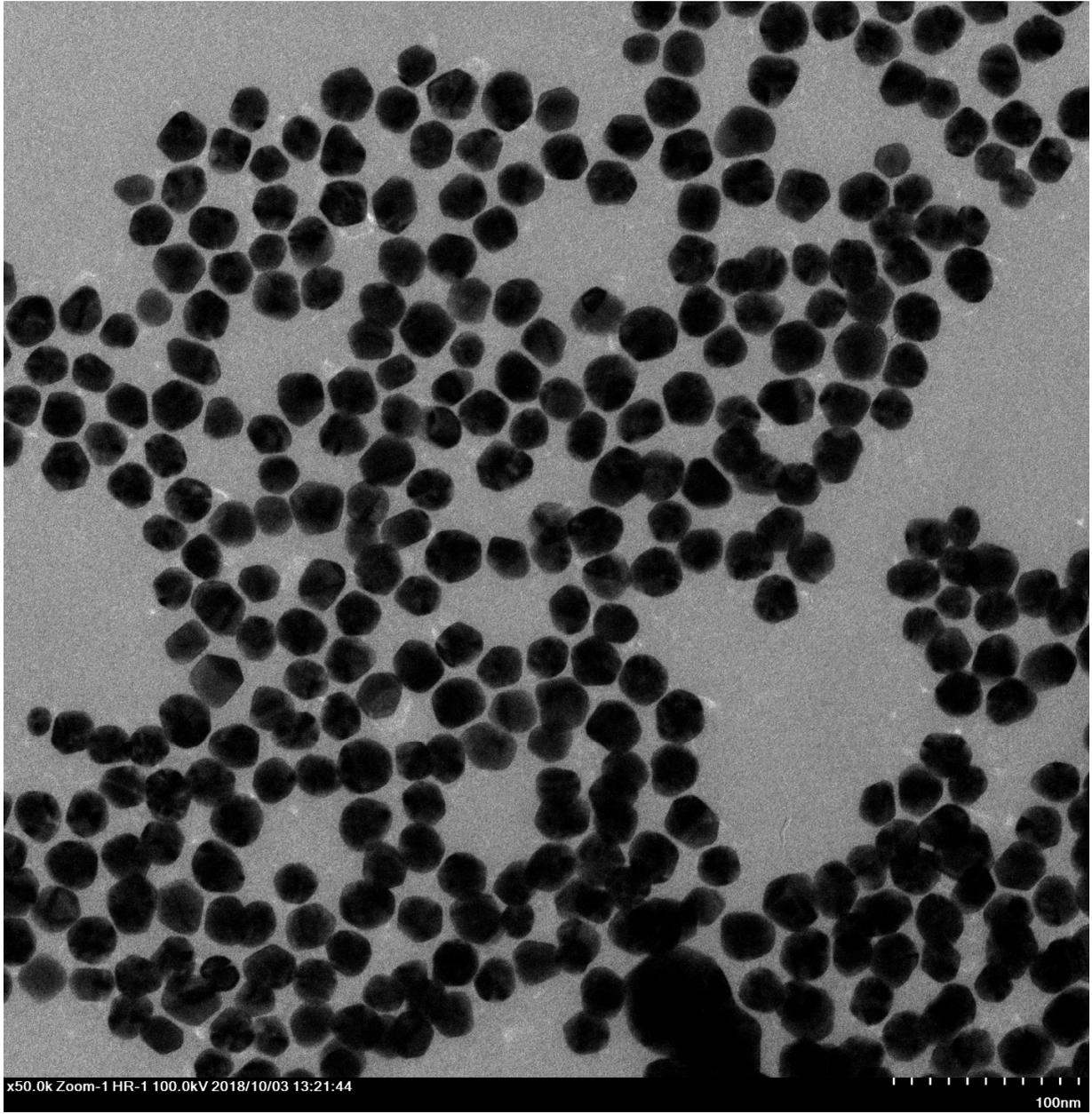


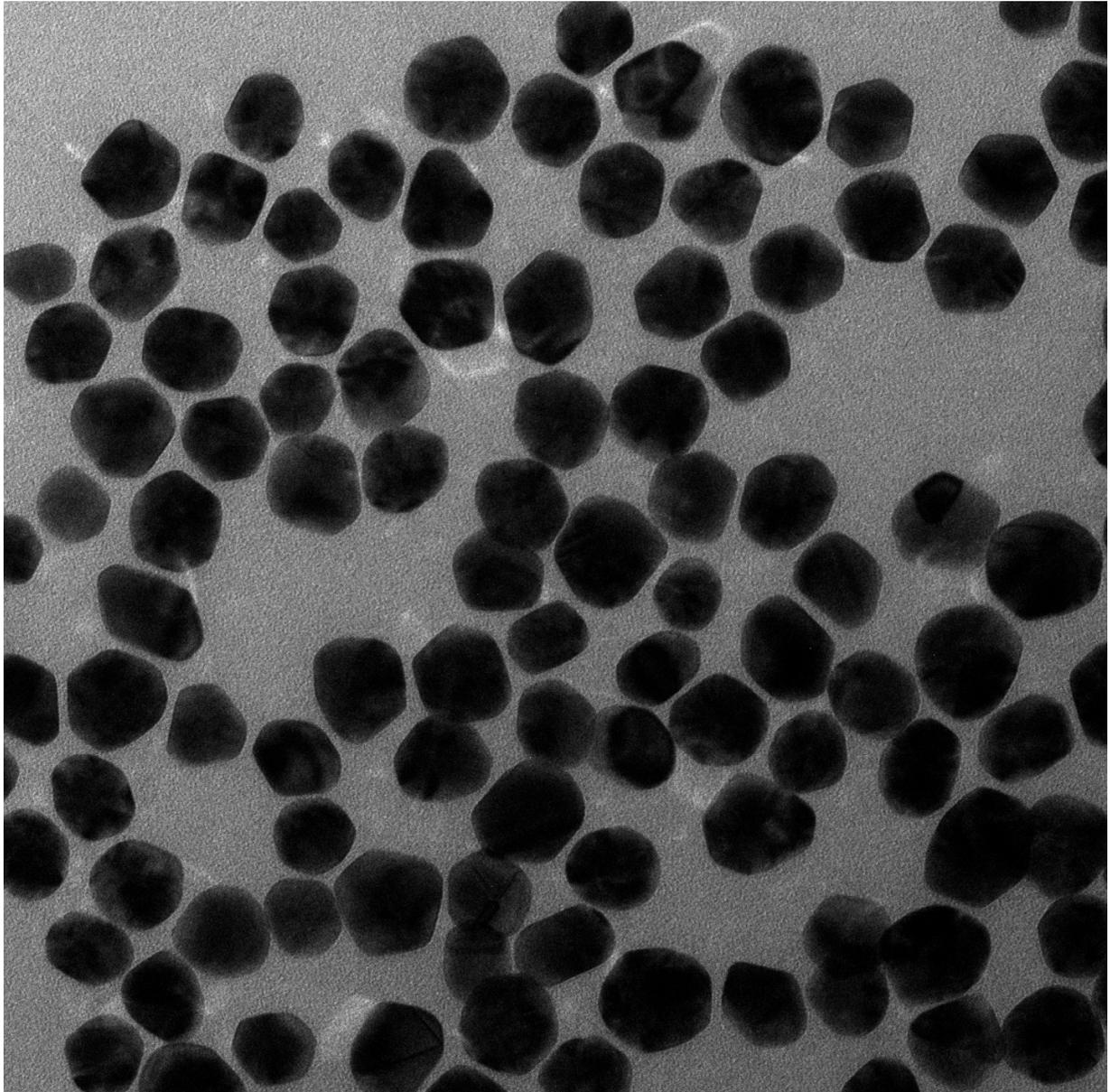
x100k Zoom-1 HR-1 100.0kV 2019/01/14 13:24:52

50nm

**ODS Stabilized Gold Nanoparticles in Toluene:**







x100k Zoom-1 HR-1 100.0kV 2018/10/03 13:23:29



50nm