

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 μ l of nanoparticle sample, with ~50 μ l CDCl_3 .

IR spectra of dried 2-AST Gold Nanoparticles

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

IR Spectra of dried 2-AST

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

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

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

IR Spectra n-butyldisilane

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

n-butylsilane stabilized Gold Nanoparticles

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

IR Spectra of ODS stabilized Gold Nanoparticles

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

Figure S1: HNMR of n-butylsilane.

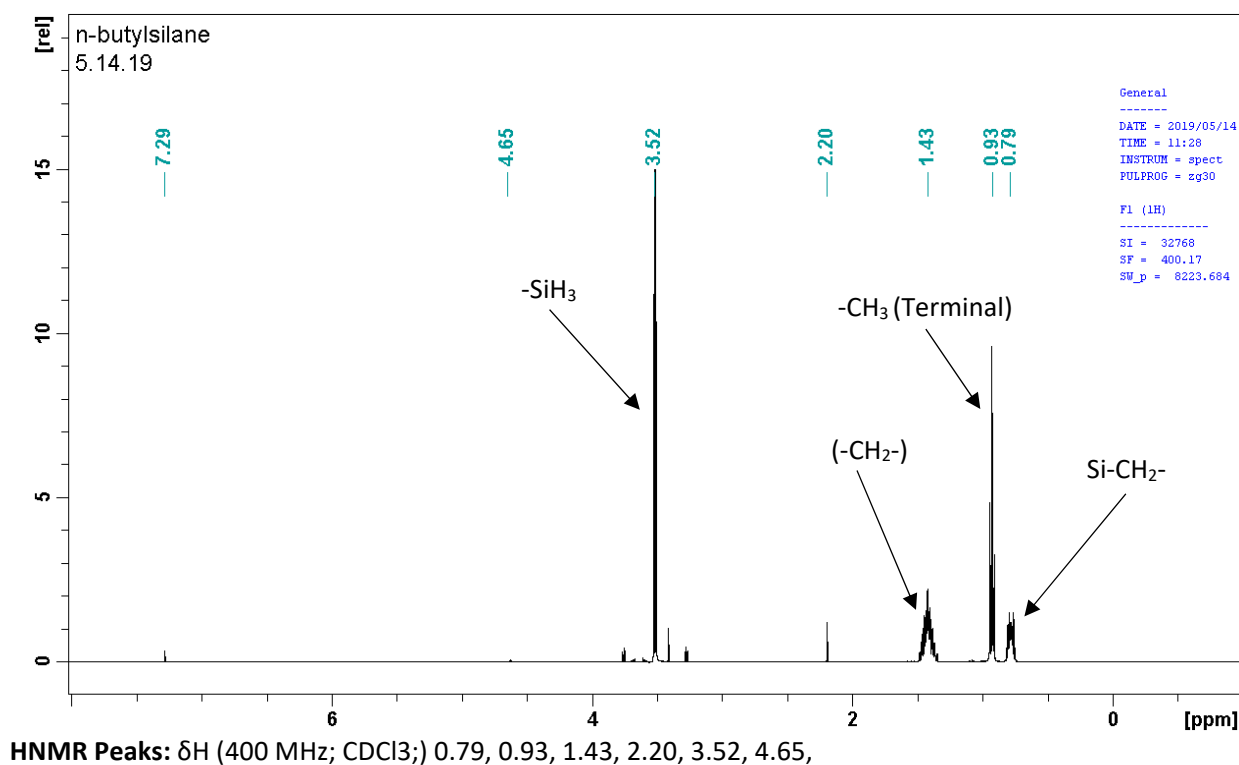
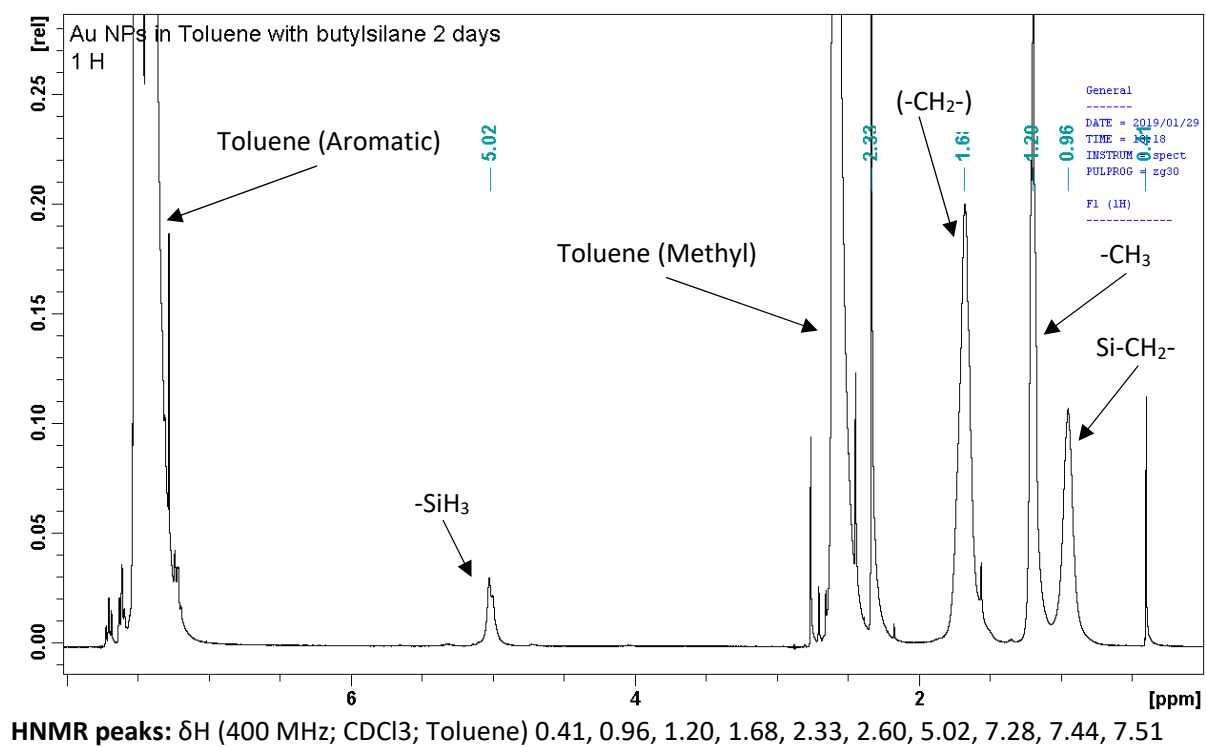
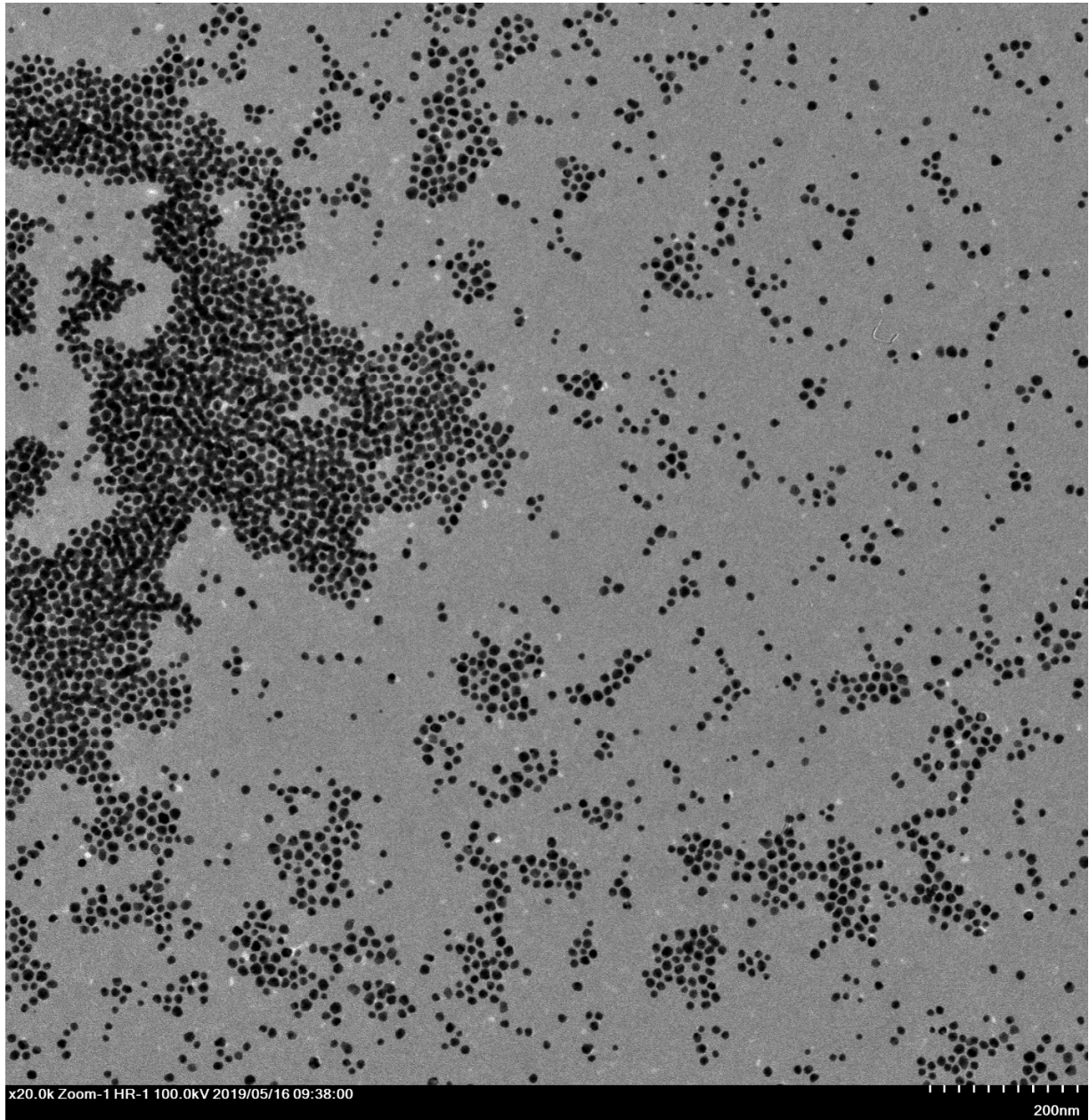


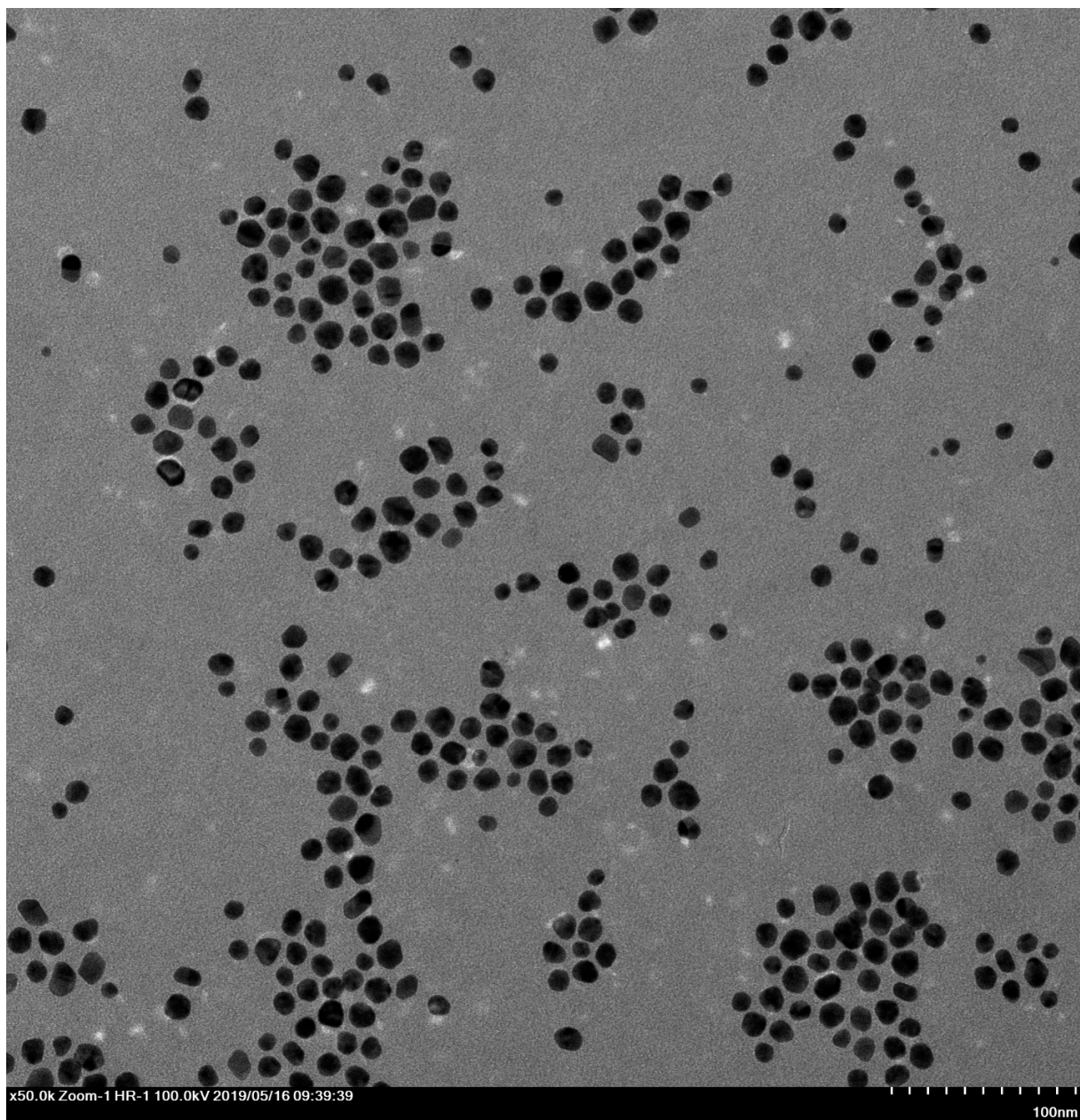
Figure S2: Butylsilane stabilized Gold Nanoparticles in Toluene.

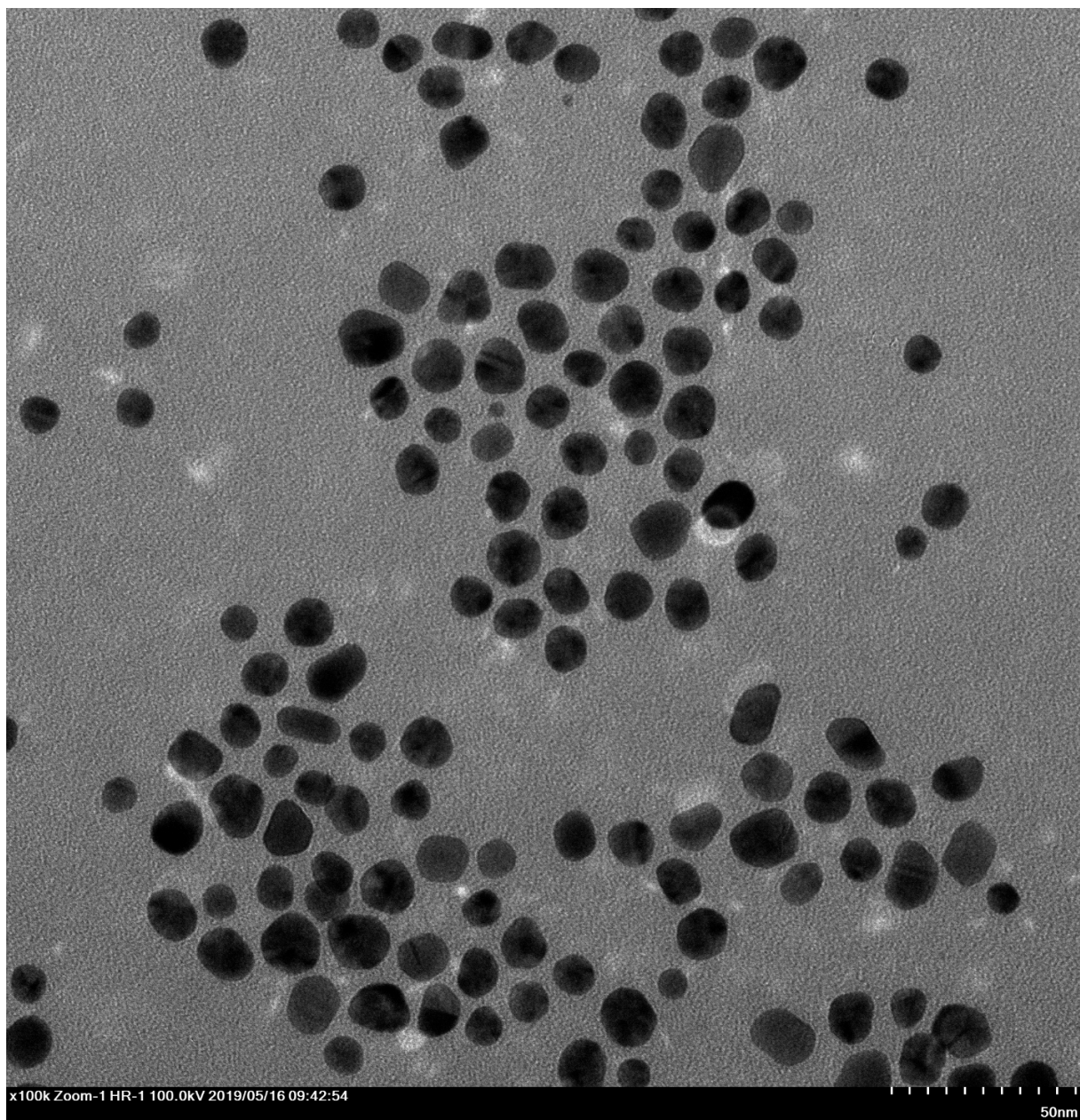


TEM Images:

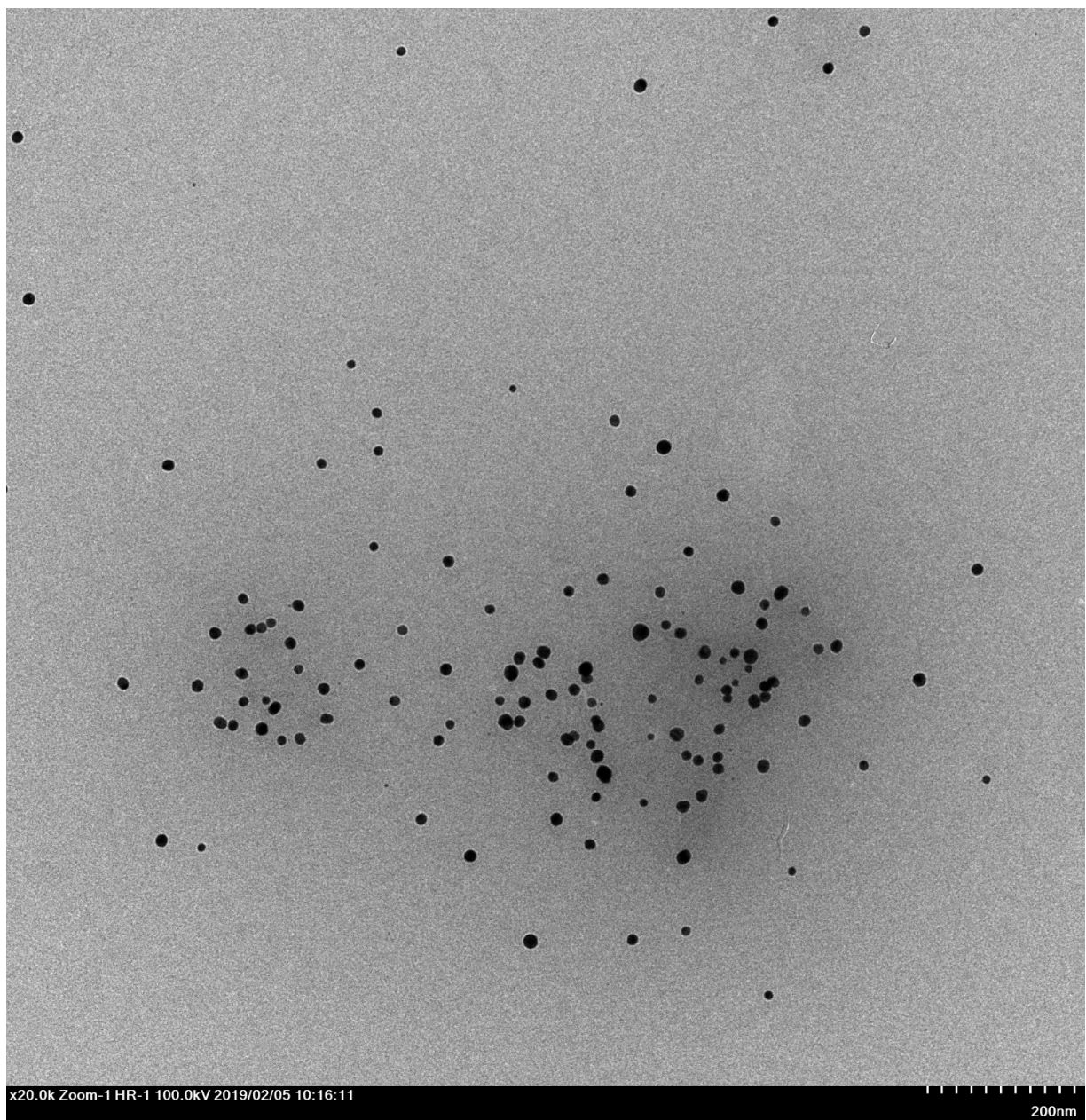
2-AST Gold Nanoparticles in Water:

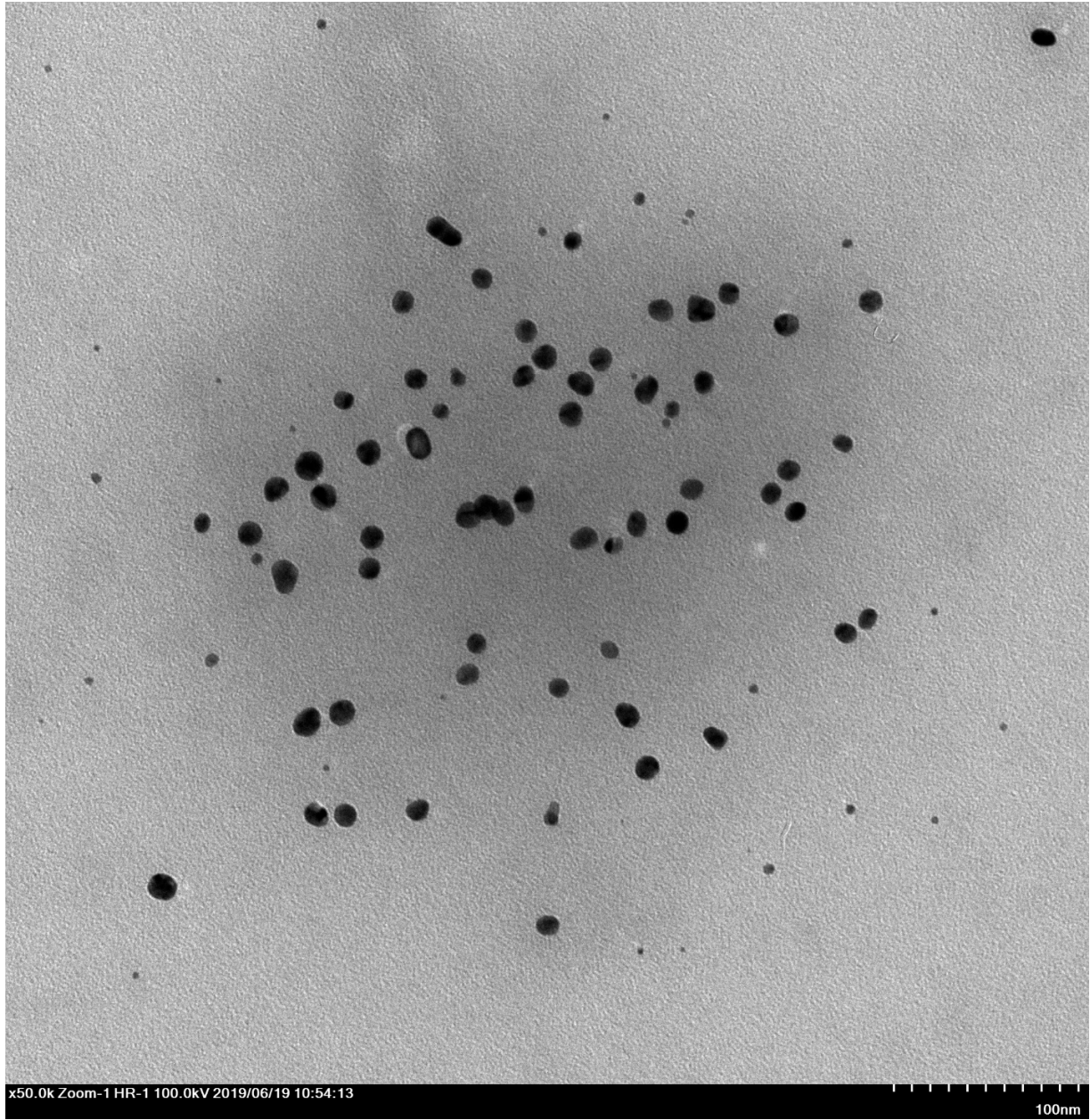




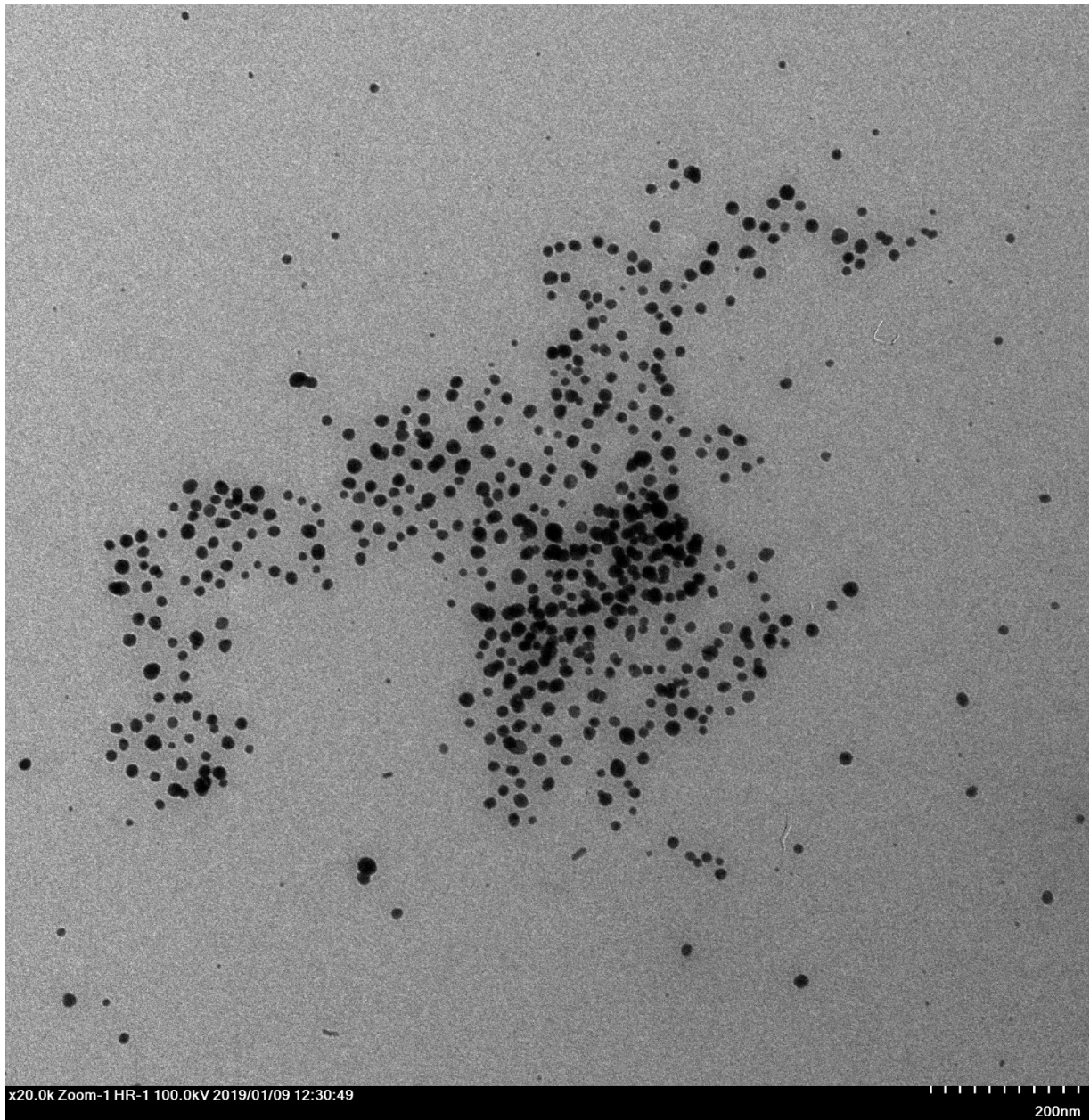


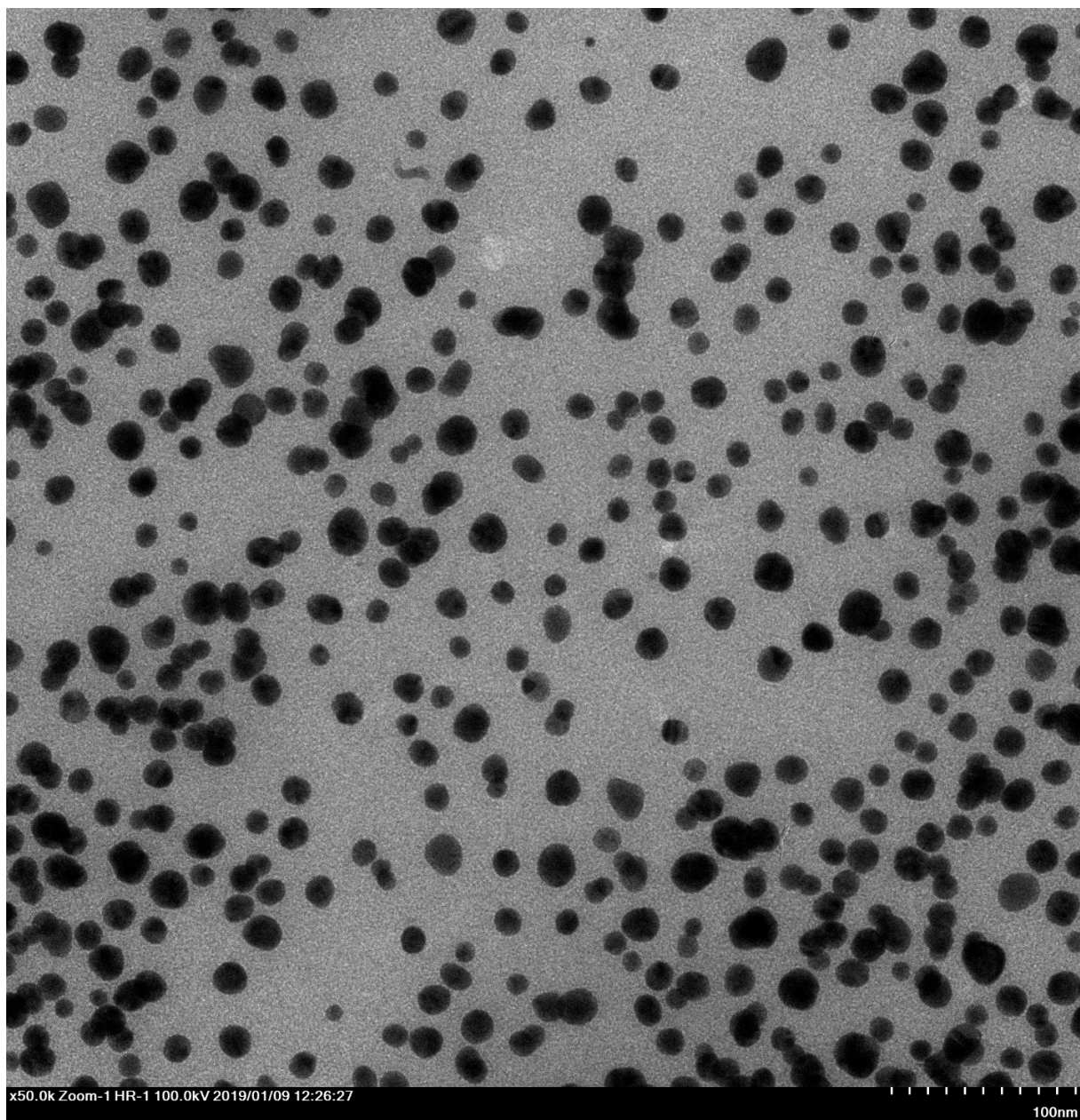
Butylsilane Stabilized Nanoparticles in Toluene:

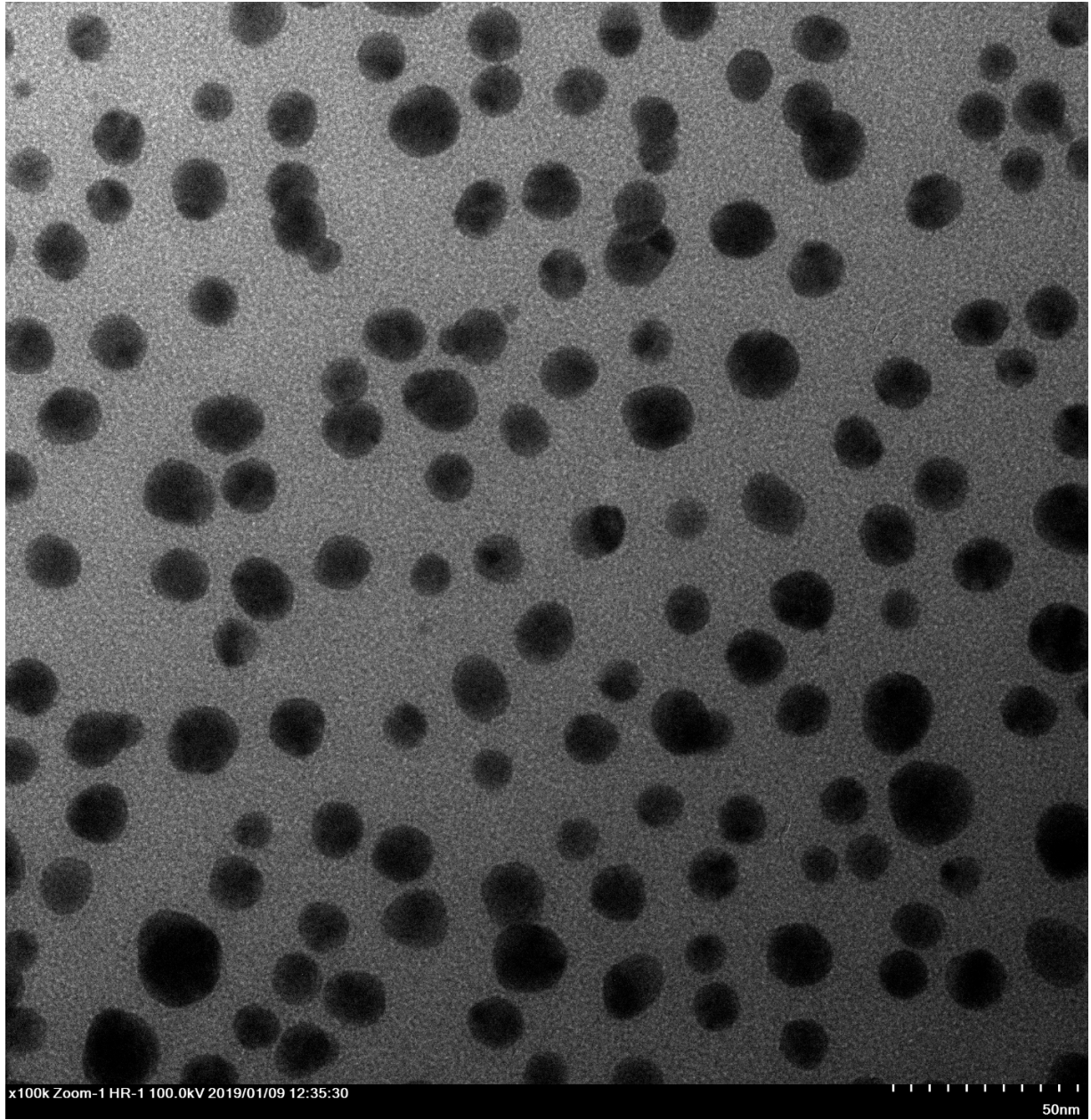




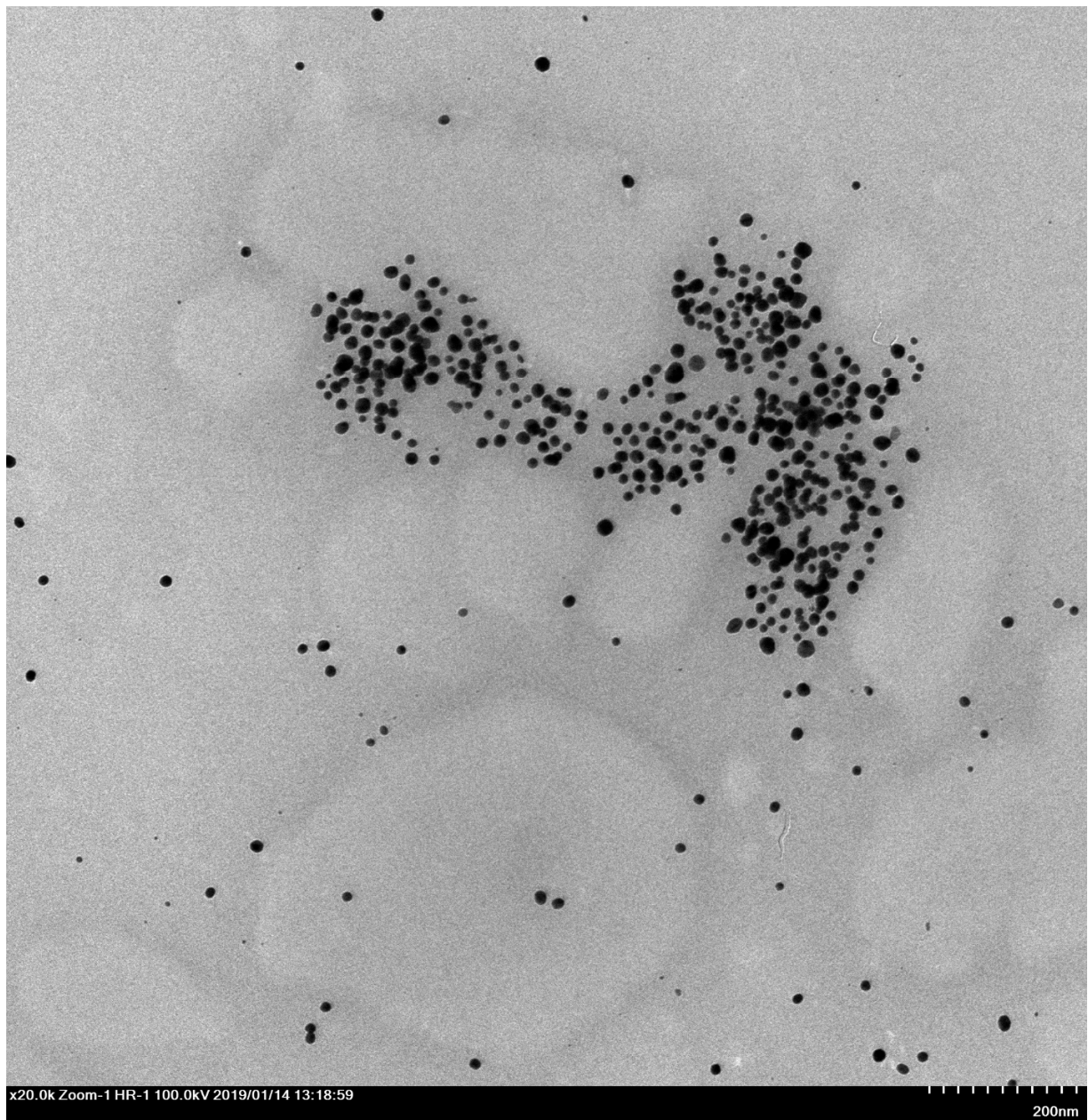
Hexylsilane Stabilized Nanoparticles in Toluene:

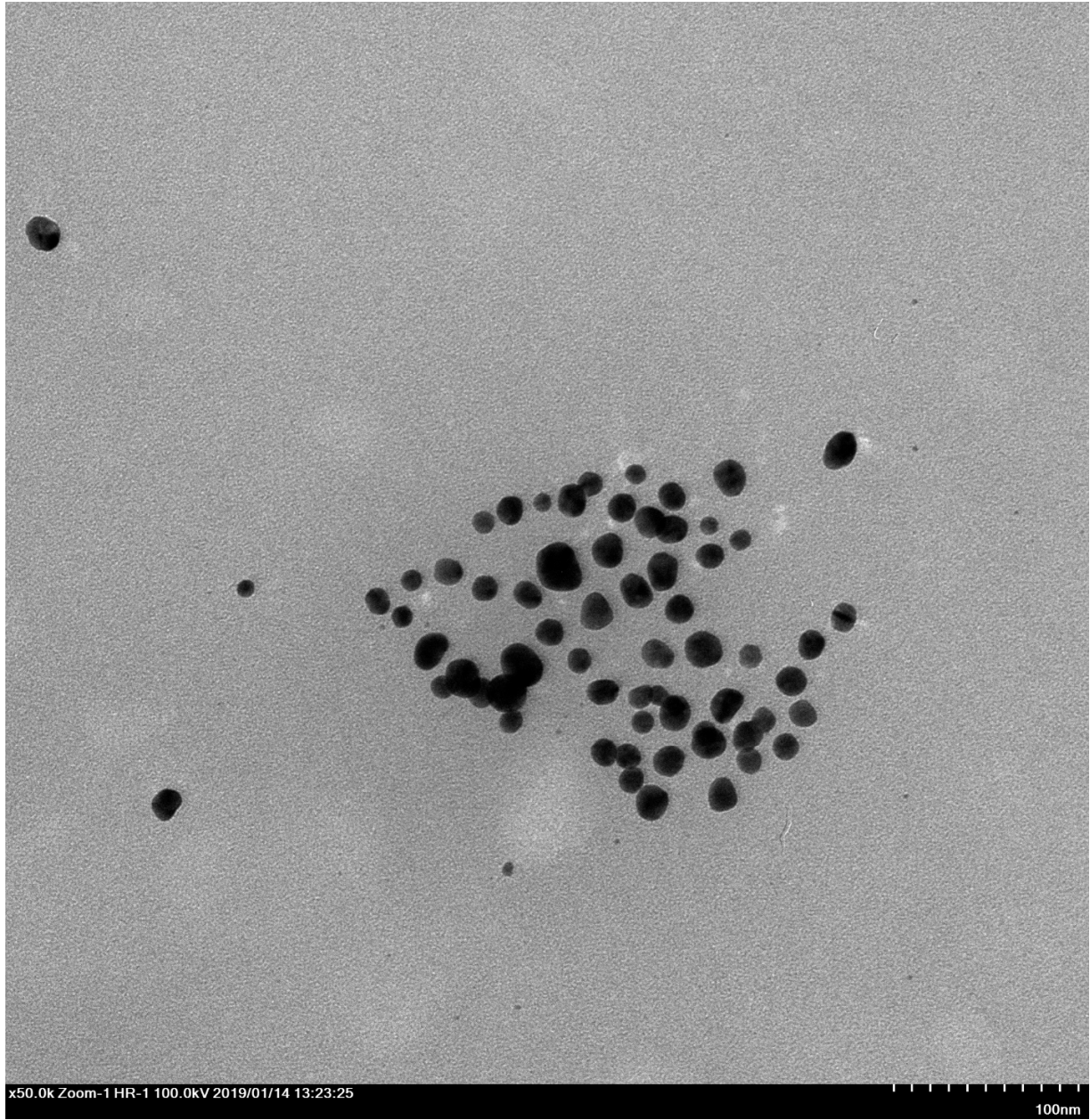


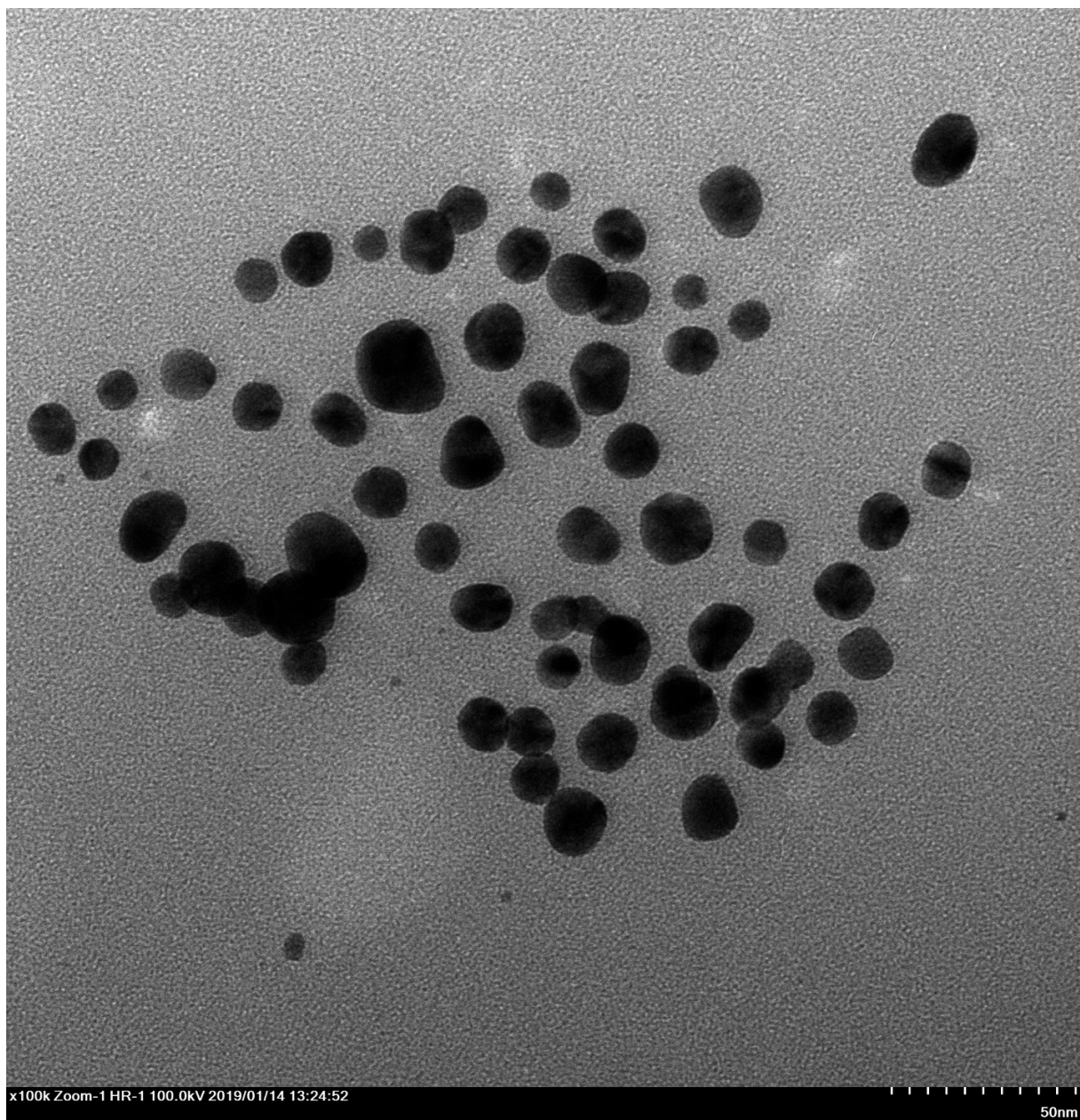




Octylsilane Stabilized Nanoparticles in Toluene:







ODS Stabilized Gold Nanoparticles in Toluene:

