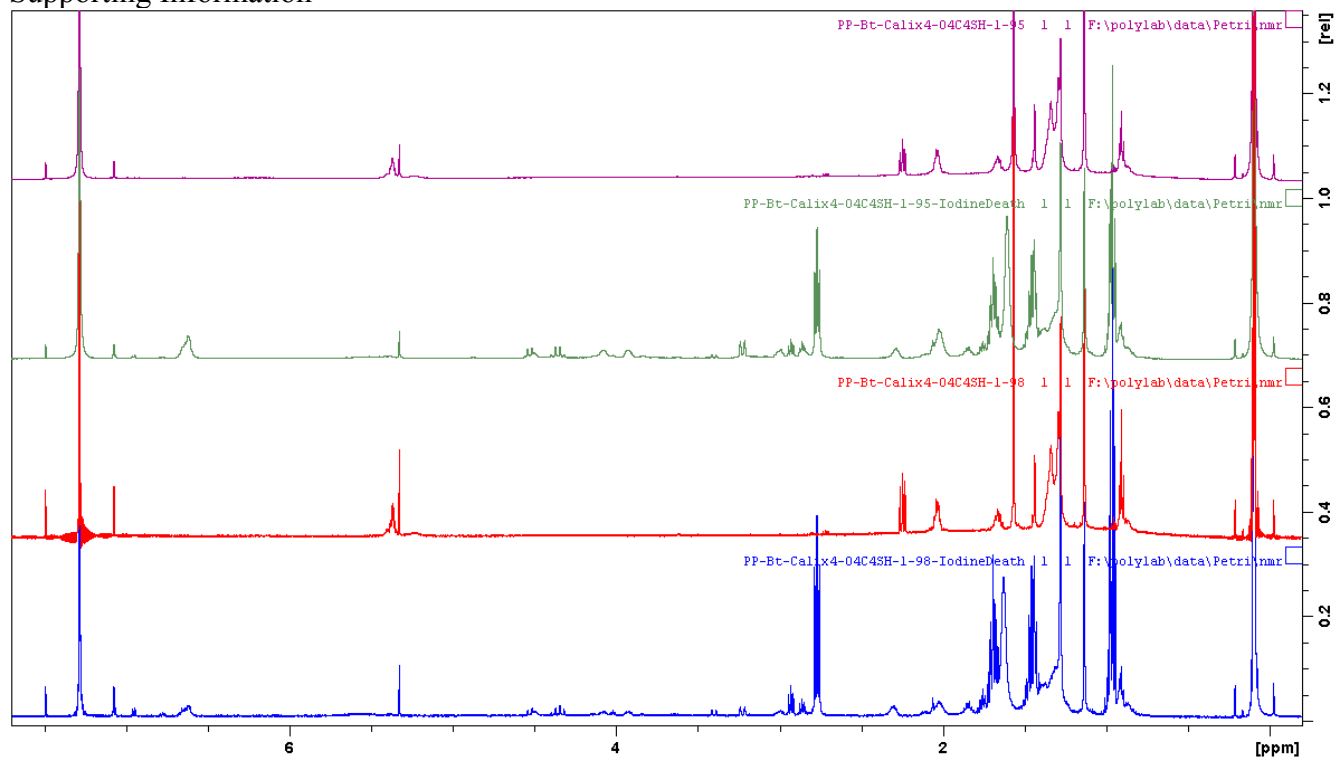
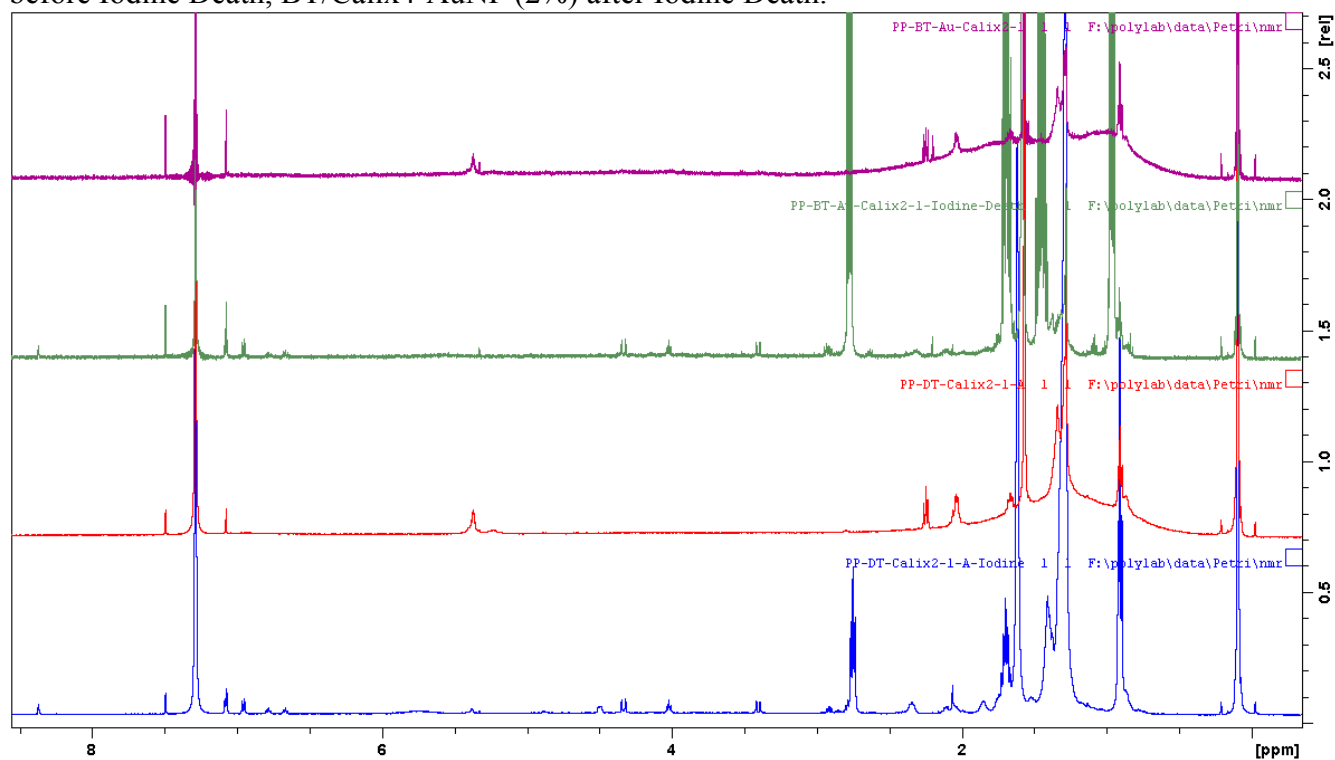


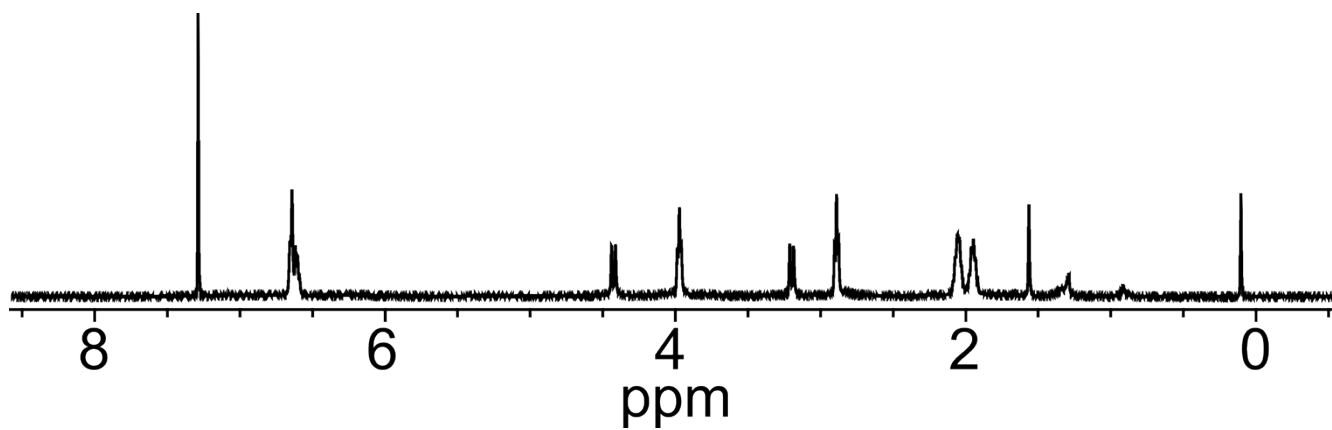
### Supporting Information



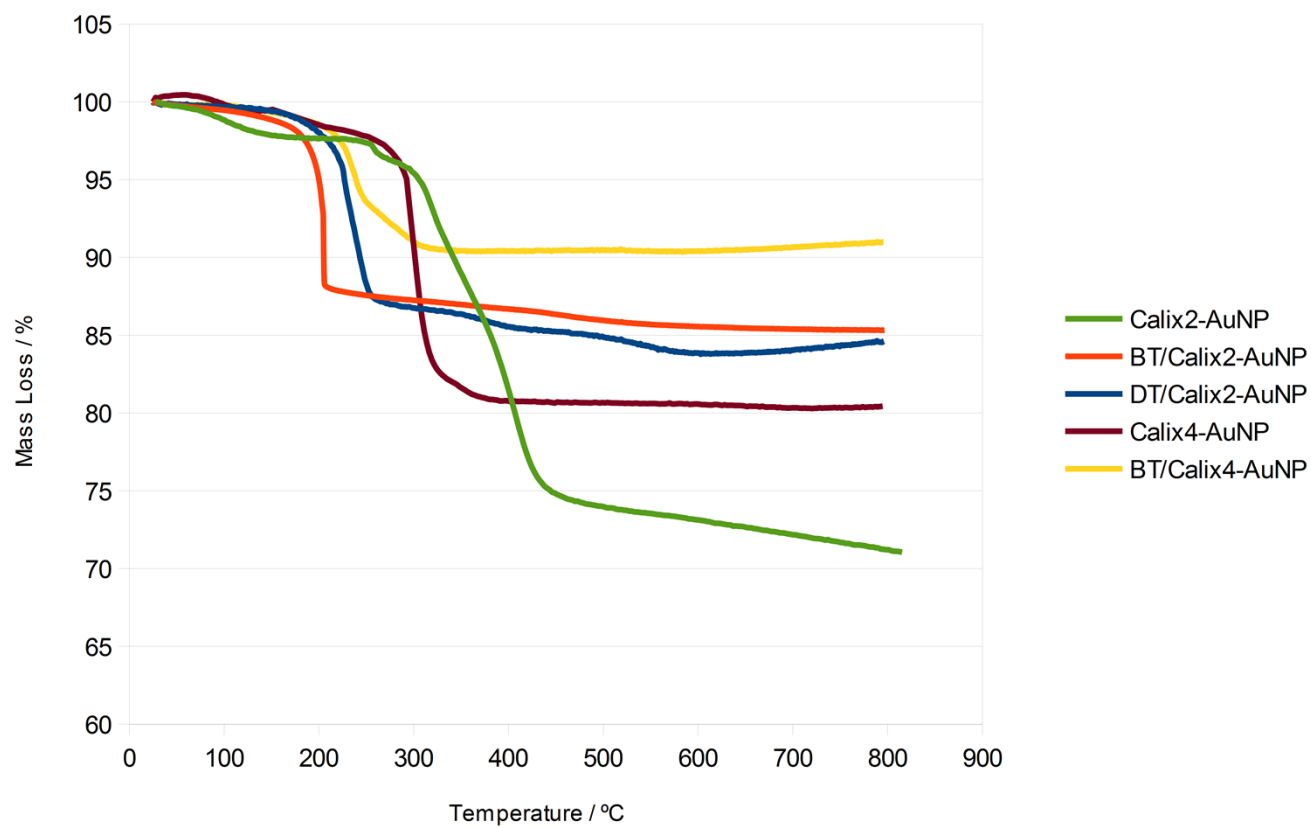
S1 Spectra for Iodine Death reaction for BT/Calix4-AuNP. From top to bottom: BT/Calix4-AuNP (5% Calix4 in feed) before Iodine Death, BT/Calix4-AuNP (5%) after Iodine Death, BT/Calix4-AuNP (2%) before Iodine Death, BT/Calix4-AuNP (2%) after Iodine Death.



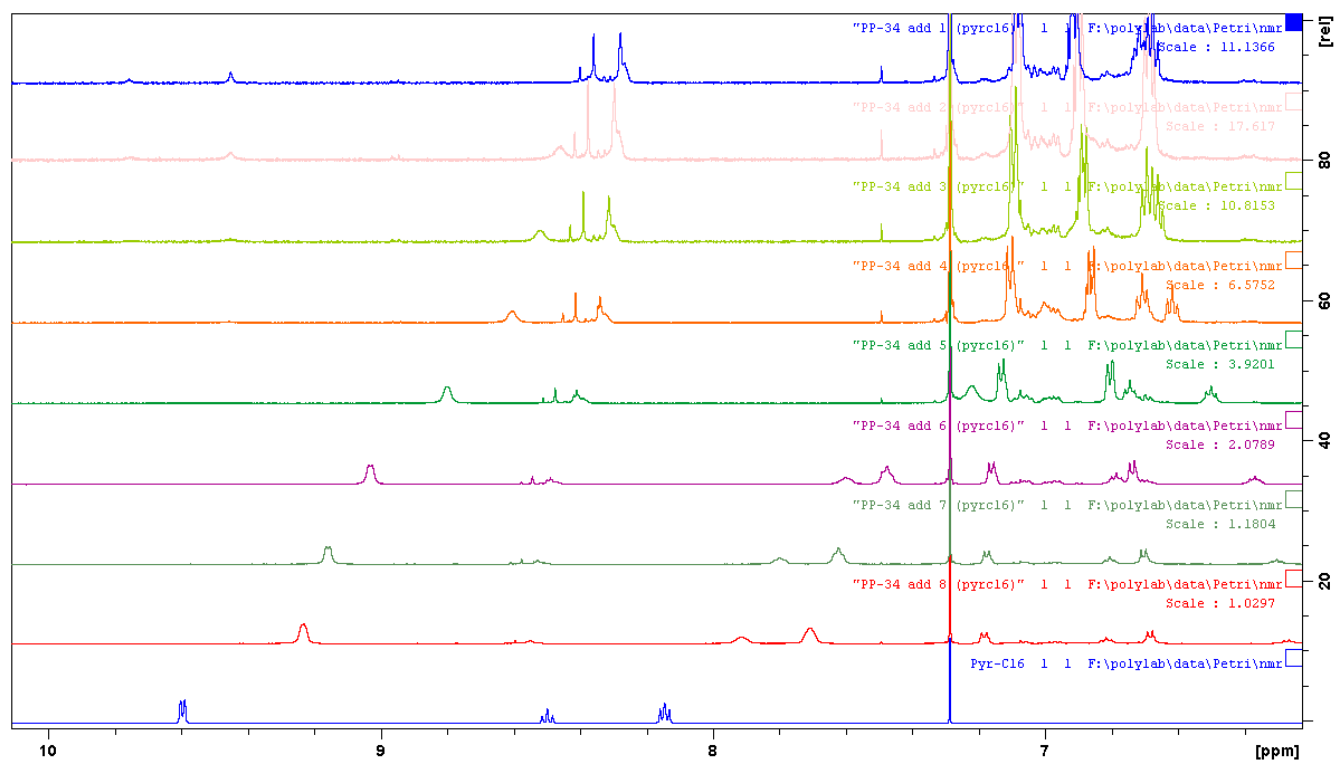
S2 Spectra for Iodine Death reaction for BT/Calix2-AuNP and DT/Calix2-AuNP. From top to bottom: BT/Calix2-AuNP before Iodine Death, BT/Calix2-AuNP after Iodine Death, DT/Calix2-AuNP before Iodine Death, DT/Calix2-AuNP after Iodine Death.



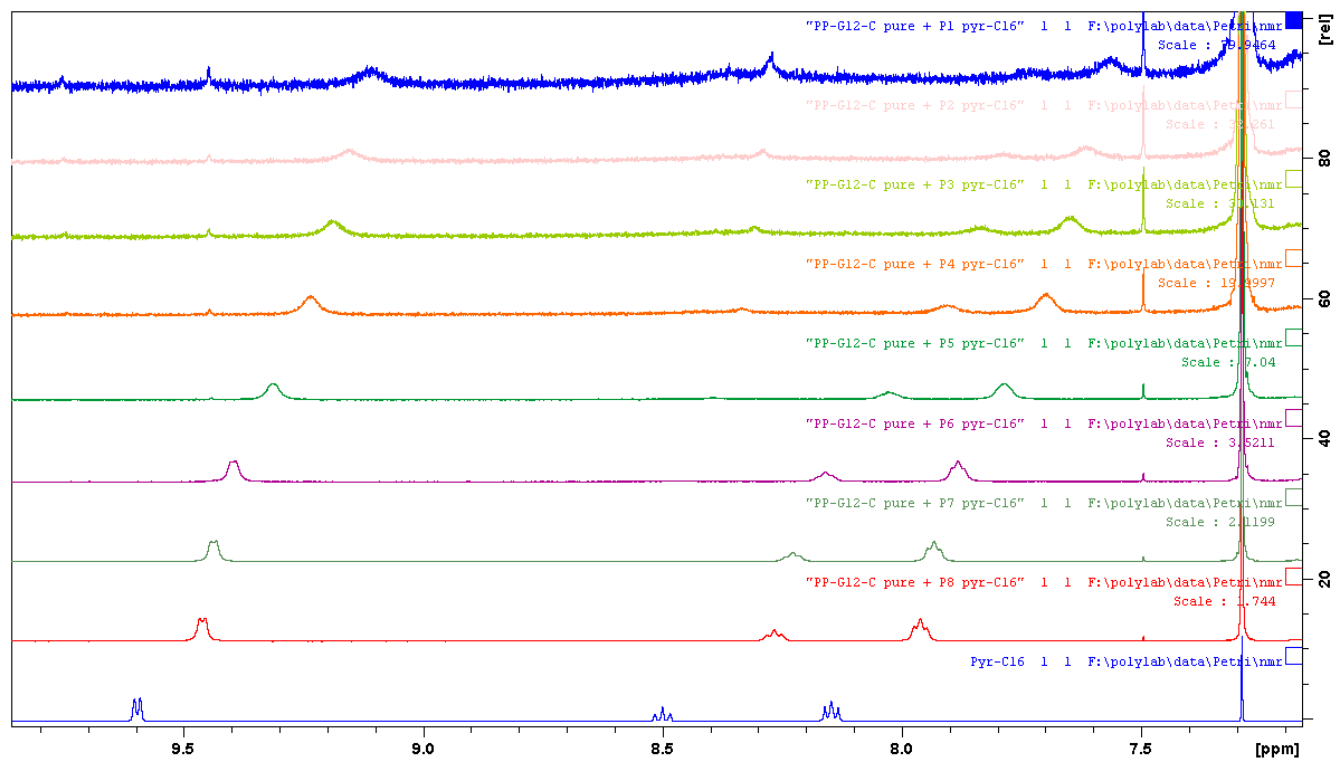
S3 Spectra for Calix4-AuNP



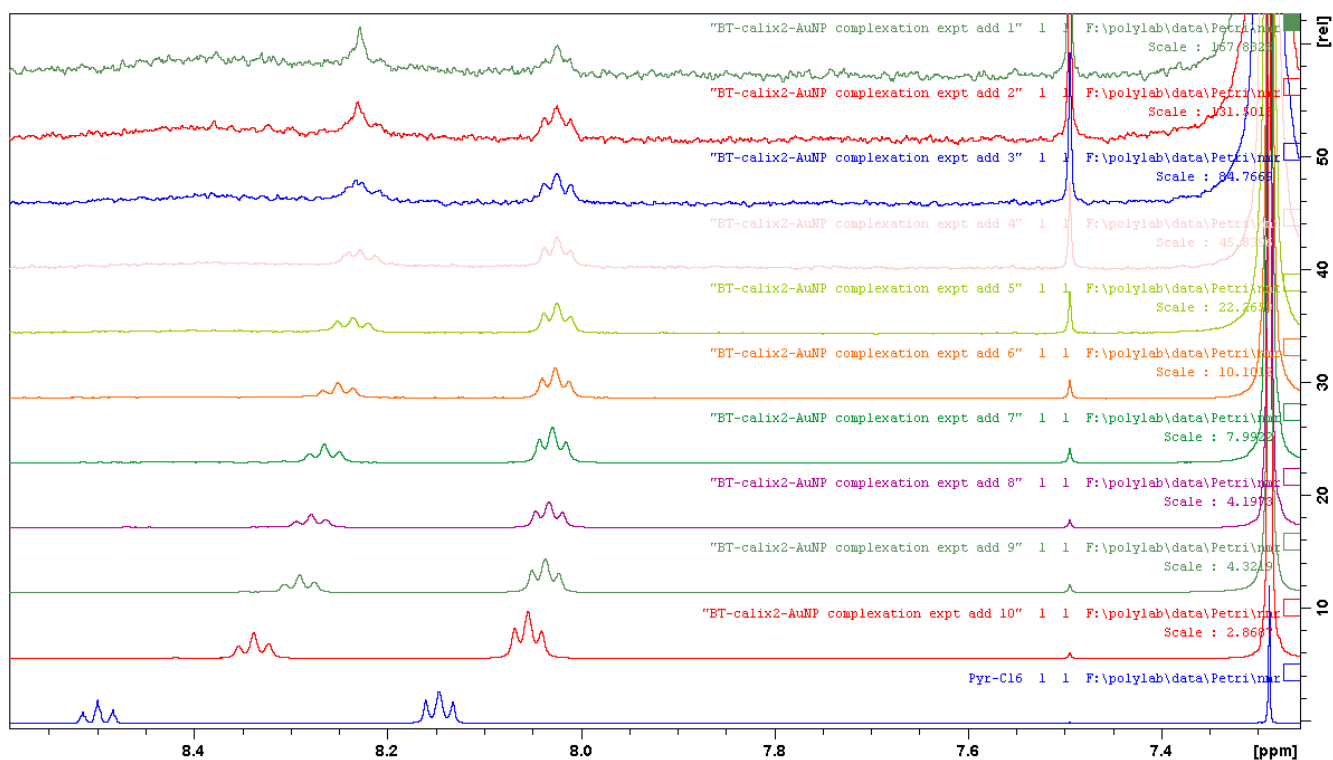
S4 TGA data for all the nanoparticles.



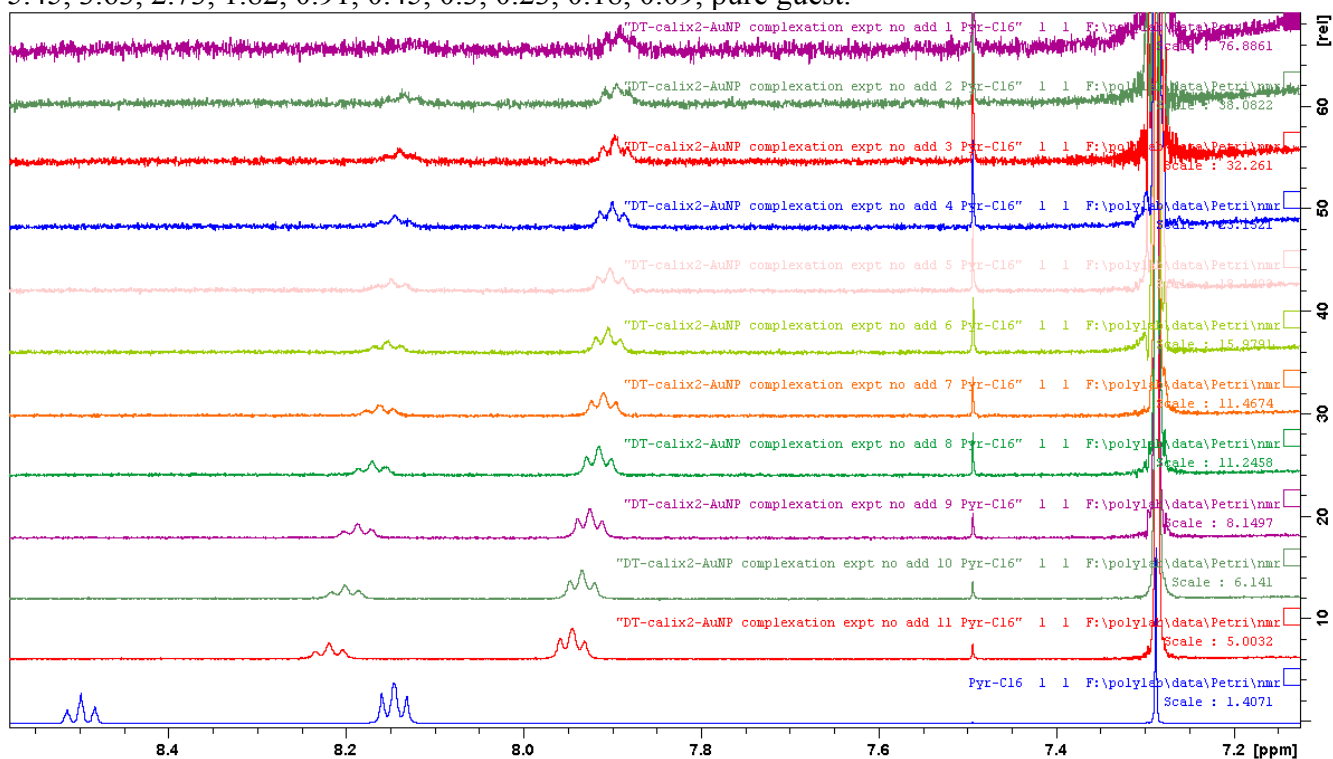
S5 Spectrum for Free Calix2 + Pyr-C16 Complexation Experiment. From top to bottom: Calixarene:Guest ratio of 6.0, 4.0, 3.0, 2.0, 1.0, 0.5, 0.33, 0.25, pure guest.



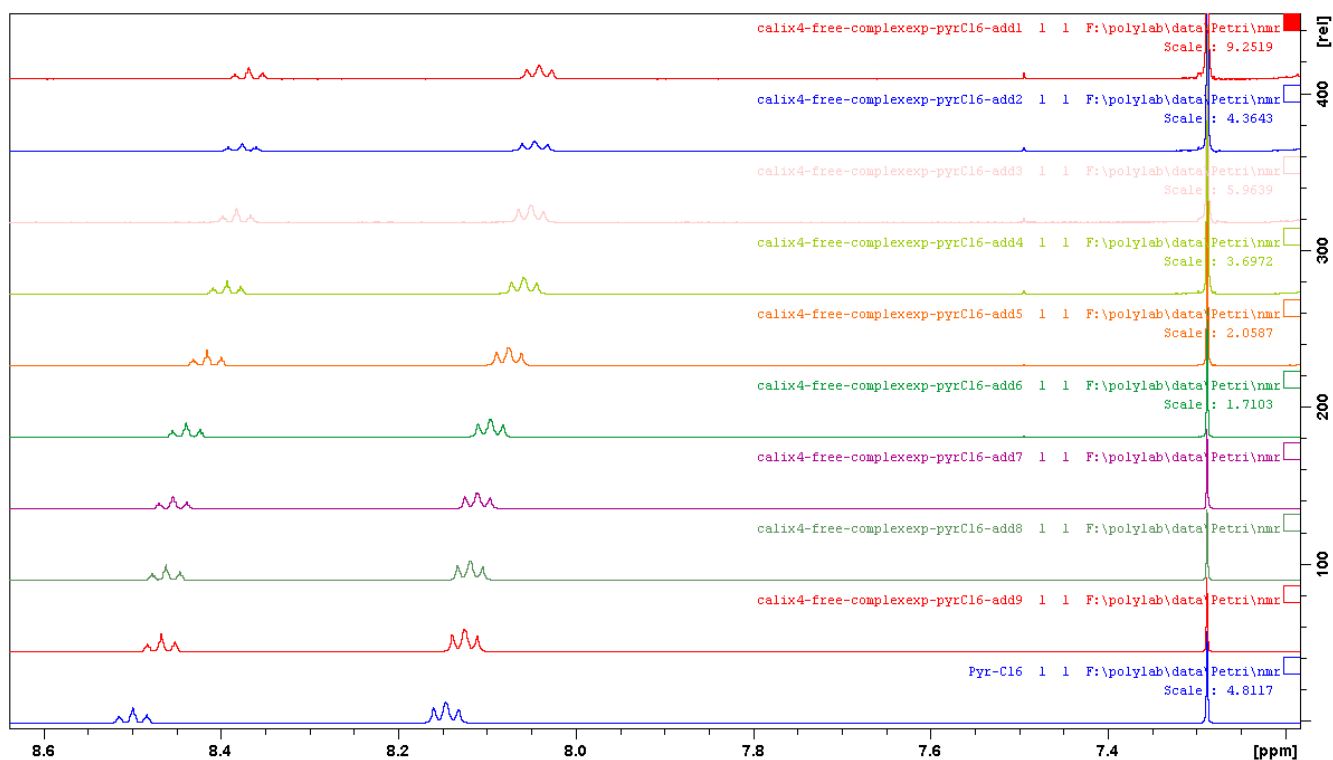
S6 Spectrum set for Calix2-AuNP + Pyr-C16 Complexation Experiment. From top to bottom: Calixarene:Guest ratio of 6.0, 4.0, 3.0, 2.0, 1.0, 0.5, 0.33, 0.25, pure guest.



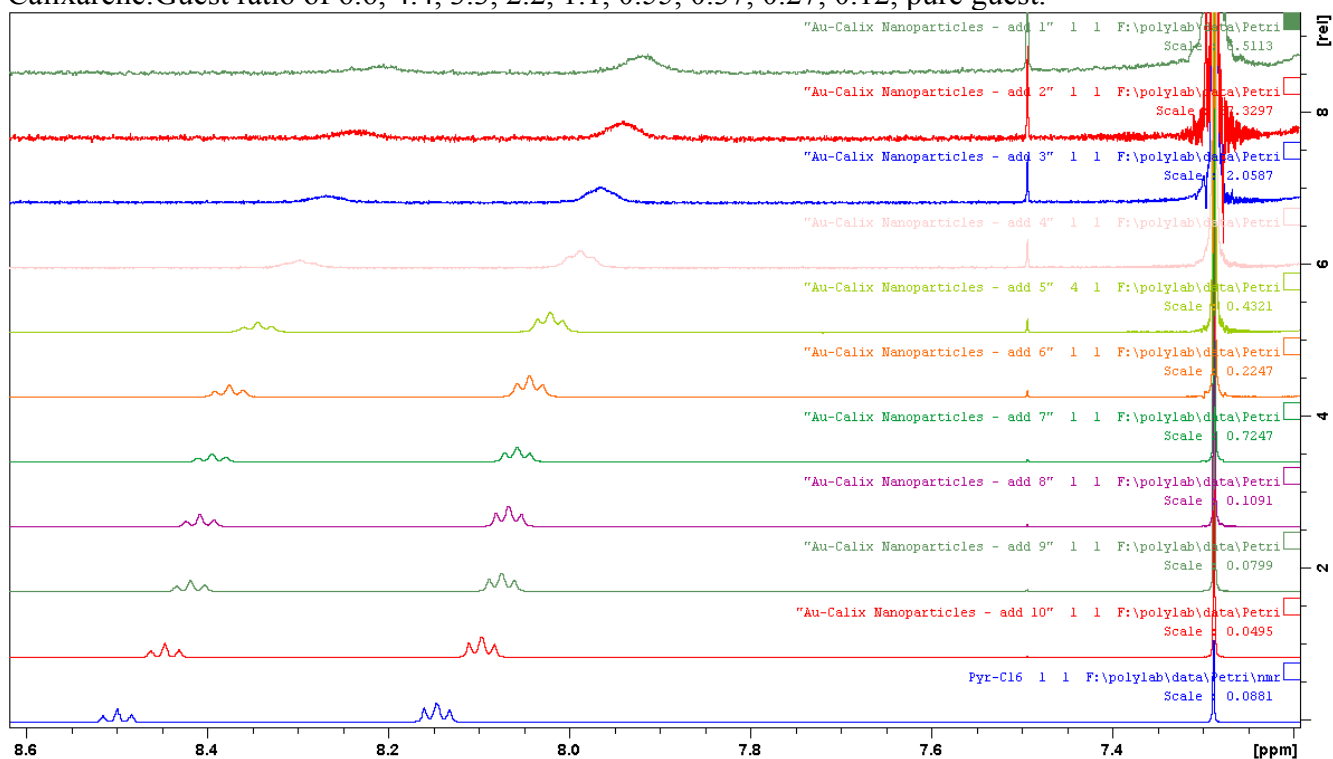
S7 Spectrum set for BT/Calix2-AuNP + Pyr-C16 Complexation Experiment. Calixarene:Guest ratio of 5.45, 3.63, 2.73, 1.82, 0.91, 0.45, 0.3, 0.23, 0.18, 0.09, pure guest.



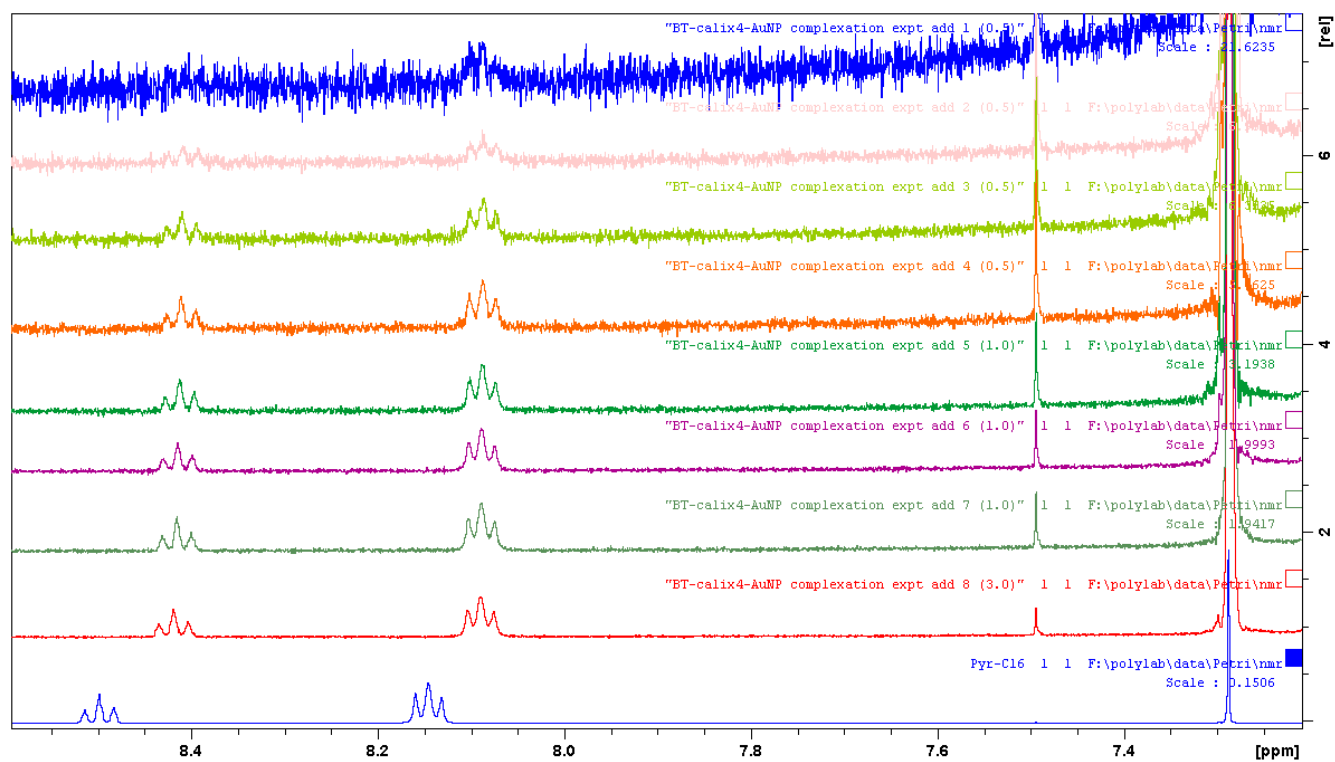
S8 Spectrum set for DT/Calix2-AuNP + Pyr-C16 Complexation Experiment. Calixarene:Guest ratio of 6.0, 4.0, 3.0, 2.0, 1.0, 0.50, 0.33, 0.25, 0.20, 0.10, 0.07, pure guest.



S9 Spectrum set for Free Calix4 + Pyr-C16 Complexation Experiment. From top to bottom: Calixarene:Guest ratio of 6.6, 4.4, 3.3, 2.2, 1.1, 0.55, 0.37, 0.27, 0.12, pure guest.



S10 Spectrum set for Calix4-AuNP + Pyr-C16 Complexation Experiment. From top to bottom: Calixarene:Guest ratio 6.0, 4.0, 3.0, 2.0, 1.0, 0.5, 0.33, 0.25, 0.20, 0.10, pure guest.



S11 Spectrum set for BT/Calix4-AuNP + Pyr-C16 Complexation Experiment. From top to bottom: Calixarene:Guest ratio of 6.0, 4.0, 3.0, 2.0, 1.0, 0.5, 0.33, 0.25, pure guest.