Supporting Information for

One-Pot Preparation of Cationic Charged Pt Nanoparticles Through an Autocatalytic Hydrolysis of Acetylthiocholine

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Experimental

The synthetic procedure for the platinum nanoparticles (Pt NPs) is described in the results and discussion section. H_2PtCl_6, $PdCl_2$, and $HAuCl_4$ were purchased from Kojima Chemicals (Japan), and acetylthiocholine iodide was obtained from Aldrich. $NaBH_4$ was obtained from Kanto chemical. The counter ion of acetylthiocholine iodide was changed to chloride by the use of ion-exchange column (Organo Amberlite IRA400JCL) before the use. Absorption spectra were recorded with a spectral photometer (Perkin Elmer, Lambda 750) with a quartz cell of 1 mm optical path. The TEM image was taken with a JEM-2000FX (JEOL) with the acceleration voltage of 200 kV. TEM samples were prepared by putting of a drop of aqueous dispersion of Pt NPs onto carbon-coated Cu grid. Size distribution was obtained by t he counting of 200 particles in an arbitrarily chosen area in an enlarged TEM image. ^{1}H-NMR spectra were measured with JMTC-400/54/SS (JEOL) by 400 MHz in D_2O or DMSO–*d6*.

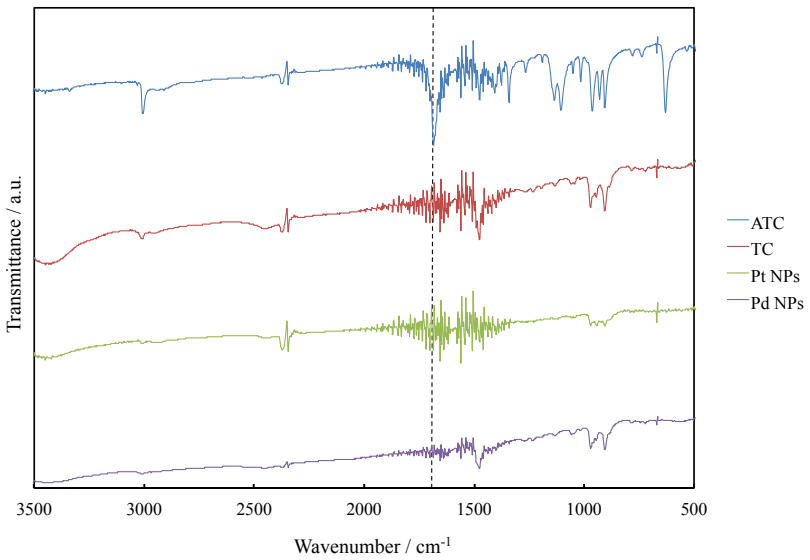

Figure S1. FT–IR spectra of ATC, synthetic TC, purified Pt NPs and Pd NPs by KBr method. A purification of NPs was carried out by a repeated ultracentrifugation (see procedure in main text), and the powder of NPs was used for IR measurements. A characteristic peak of C=O stretching vibration at 1680 cm^{-1} was observed in ATC, however it disappeared in TC, Pt and Pd NPs. This observation supports the hydrolysis of ATC to TC during the NP synthesis. Purified Au NPs did not show any IR peaks since no organic compound stabilizes Au NPs.

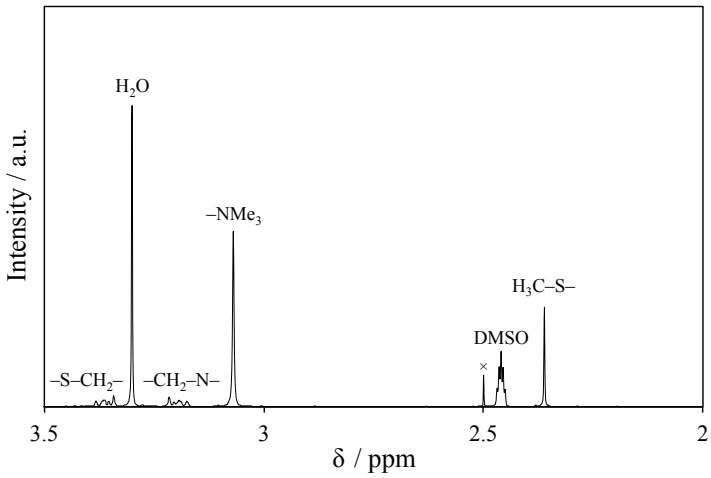

Figure S2. ^{1}H-NMR of the mixture solution of acetylthiocholine (ATC), H_2PtCl_6 and NaOH in DMSO–*d6* by 400 MHz. The concentration of ATC, H_2PtCl_6 and NaOH were same to the Pt nanoparticle synthesis.

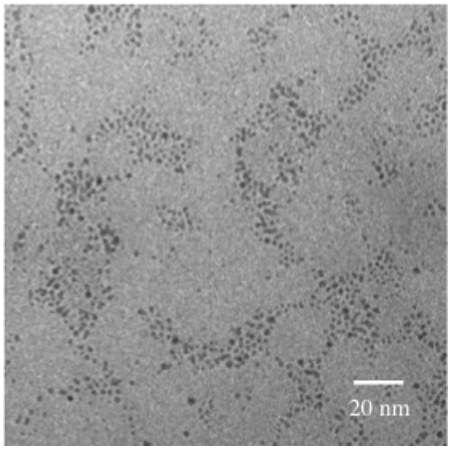

Figure S3. Magnified TEM image of Pt nanoparticles prepared at Pt : acetylthiocholine (ATC) = 1 : 3 (mol/mol).

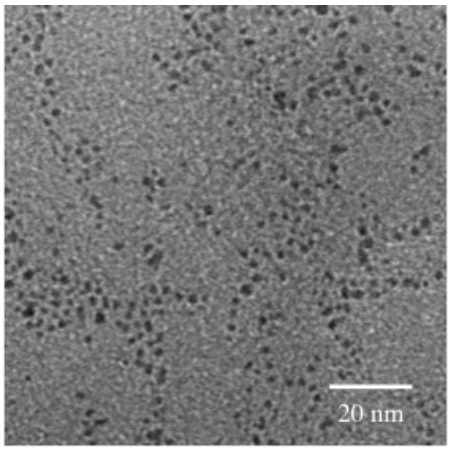

Figure S4. Magnified TEM image of Pd nanoparticles prepared at metal : acetylthiocholine (ATC) = 1 : 3 (mol/mol).