

From rational design of organometallic precursors to optimized synthesis of core/shell Ge/GeO₂ nanoparticles

D. Matioszek,^a W.-S. Ojo,^b A. Cornejo,^b . Katir,^a M. El Ezzi,^a M. Le Troedec,^c H. Martinez,^c H. Gornitzka,^d A. Castel,^a C. Nayral,^b and F. Delpech^{b*}

^a Université de Toulouse, UPS, LHFA (Laboratoire Hétérochimie Fondamentale et Appliquée), UMR/CNRS 5069, 118, Route de Narbonne, 31062 Toulouse Cedex 09, France.

^b Université de Toulouse; INSA, UPS, CNRS; LPCNO (Laboratoire de Physique et Chimie des Nano-Objets), 135 avenue de Rangueil, F-31077 Toulouse, France.

^c Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux, Université de Pau et des Pays de l'Adour, Hélioparc, 2 av. Président Angot, F-64053 Pau, France.

^d CNRS, LCC (Laboratoire de Chimie de Coordination), 205 route de Narbonne, BP 44099, F-31077 Toulouse Cedex 4, France; Université de Toulouse, UPS, INPT, F-31077 Toulouse Cedex 4, France.

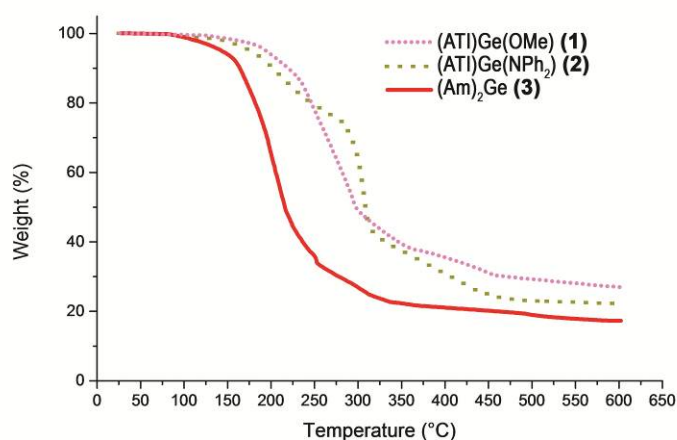


Figure S1. Thermal gravimetric analyses of compounds **1-3**.

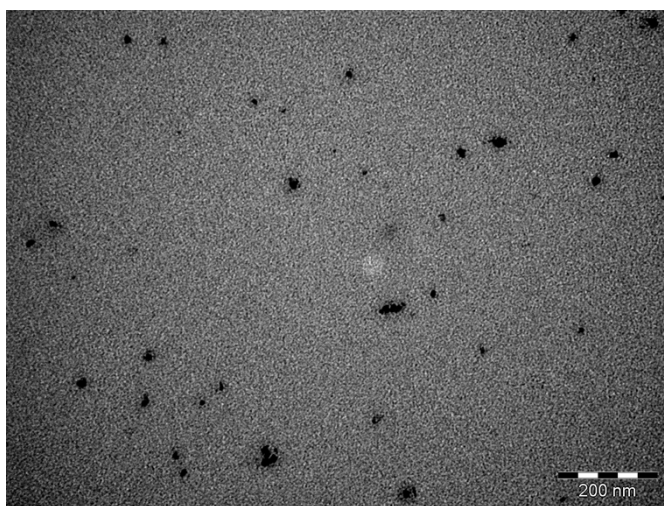


Figure S2. TEM image of germanium NPs prepared from **1** at 320°C in the absence of oleic acid.

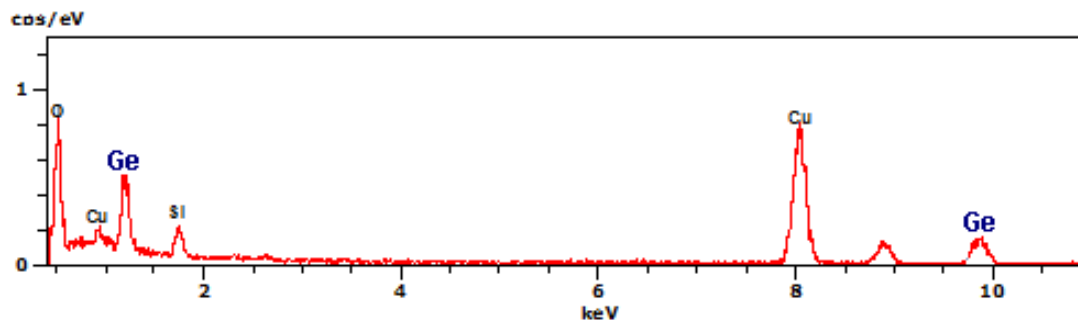


Figure S3. EDX spectrum of germanium NPs prepared from **1** at 320°C.

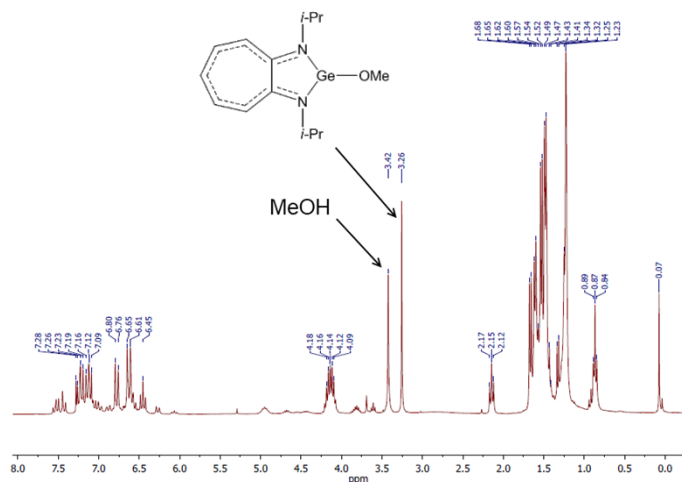


Figure S4. ^1H NMR spectrum (CDCl_3) of the reaction between **1** and carboxylic acid.

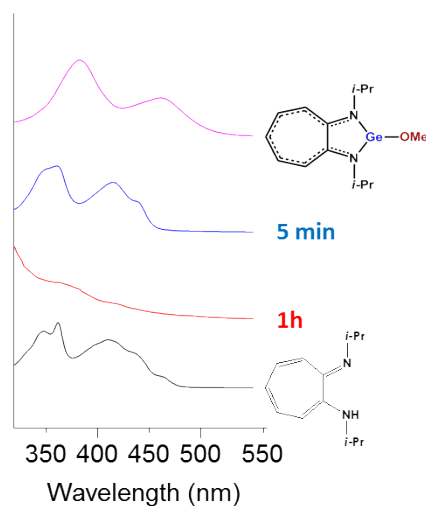


Figure S5. Monitoring of the thermolysis of **1** at 320°C in the presence of oleic acid using UV-Vis spectroscopy.

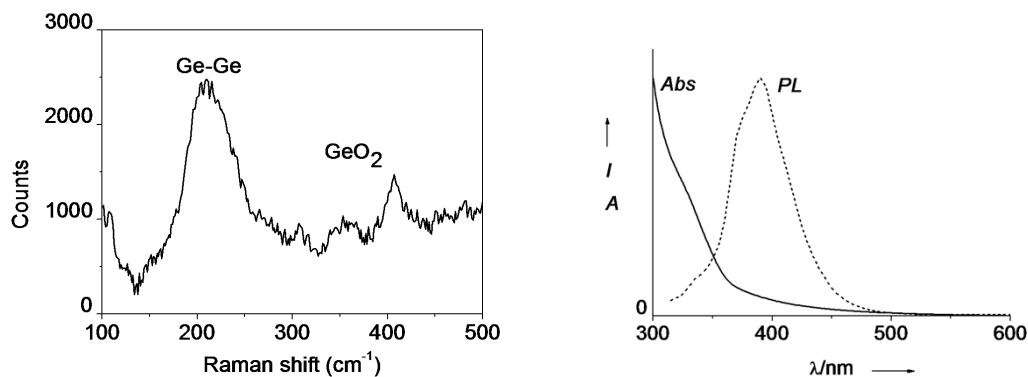


Figure S6. Raman spectrum and UV-Vis and PL spectra of the germanium NPs prepared from **3** at 160°C.

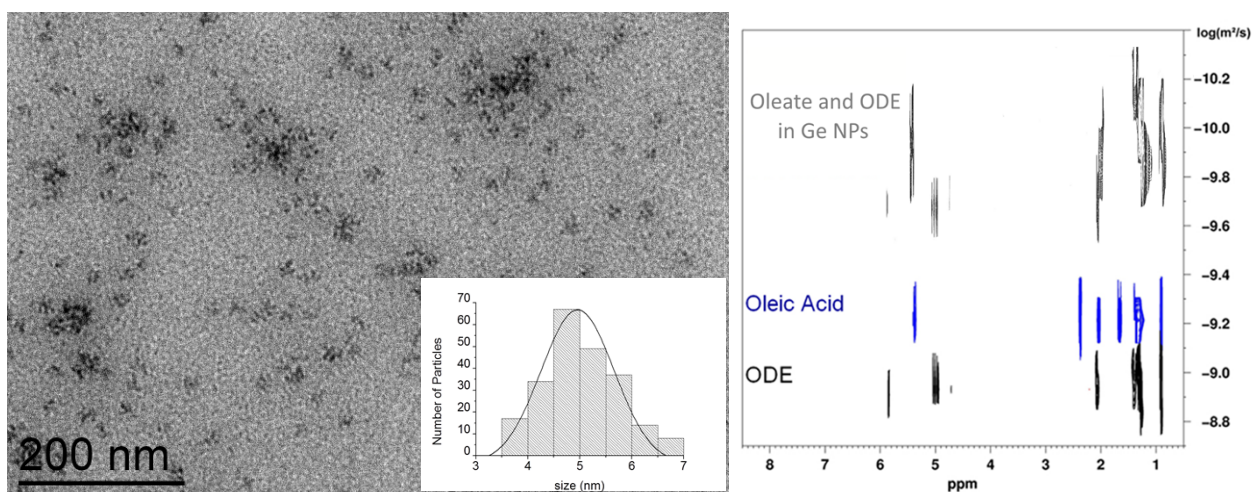


Figure S7. TEM images of germanium NPs (5.0(0.7) nm) prepared from **3** at 320°C in the presence of oleic acid (10 equiv.) (left). Overlay of 2D DOSY NMR spectra, in CDCl₃, of pure oleic acid, of pure ODE and of germanium NPs prepared from **3** at 320°C (right).

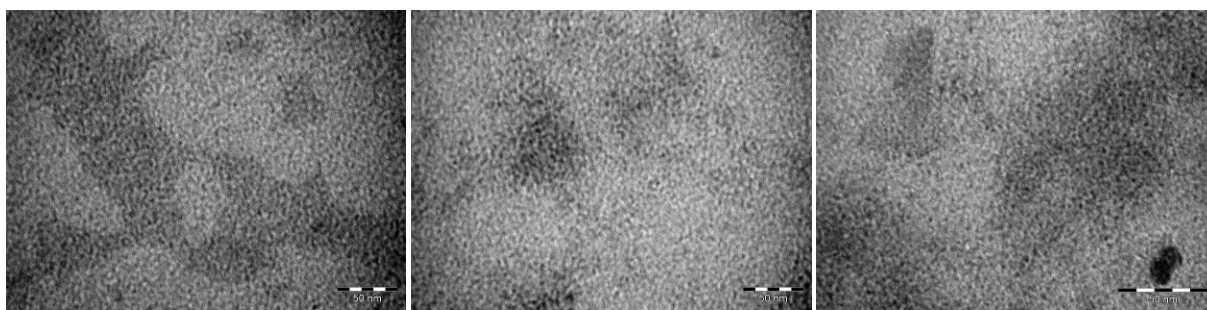


Figure S8. TEM images of germanium NPs prepared from **3** at 160°C in the presence of oleic acid and hexadecylamine (1:1) (left), in the presence of stearic acid and octadecylamine (1:1) (middle), in the presence of stearic acid and oleylamine (1:3) (right).

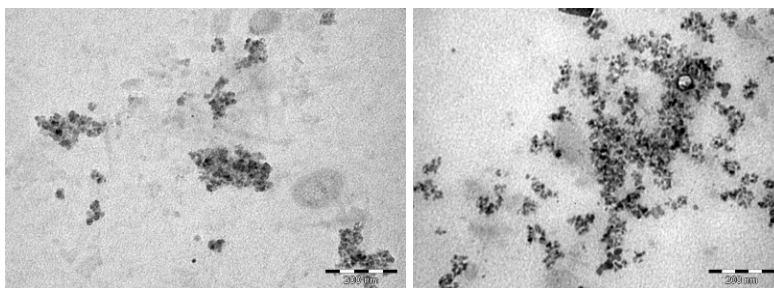


Figure S9. TEM images of germanium NPs prepared from **3** at 320°C in the presence of oleylamine (7.5 equiv.) (left), in the presence of oleylamine and trioctylphosphine (1.4:1) (right).

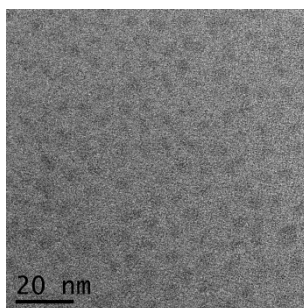


Figure S10. HRTEM images of germanium NPs prepared from **3** at 320°C.