

NANO MICRO
small

Supporting Information

for *Small*, DOI: 10.1002/smll.201200192

Anisotropic Janus Catalysts for Spatially Controlled Chemical Reactions

*Weipeng Lv, Kyung Jin Lee, Jinjing Li, Tae-Hong Park,
Sangyeul Hwang, A. John Hart, Fengbao Zhang, and Joerg
Lahann **

Supporting Information for DOI: 10.1002/sml.201200192

1. Characterization

Confocal laser scanning microscopy (CLSM; Olympus FluoView 500) is used to examine the compartmentalized fluorescence distributions in the bicompartmetal PLGA/TTBO particles. A 405 nm UV laser and 488 nm Argon laser are used to excite MEHPV and PTDPV respectively. The barrier filter for detection range is confined to 430-460 nm for MEHPV and 505-525 nm for PTDPV. The particles for CLSM imaging are collected on glass coverslips which are placed on top of the Al substrate during EHD co-jetting. Scanning electron microscopy (SEM; FEI Nova Nanolabs) is used to characterize surface morphology of bicompartmental particles, and CNTs grown on the TiO₂ particles. An energy dispersive spectrometer (EDX) is used to observe the elemental distribution of the particles. All samples are sputtered with gold before SEM and EDS imaging. The PLGA/TTBO particles and TiO₂ particles with CNTs are directly observed under SEM on the Al or quartz substrate. For TiO₂ particle imaging, about 10 μ l of a TiO₂ particle water suspension is cast on a small piece of Al or glass substrate, and water is allowed to evaporate at room temperature. Dynamic light scattering (DLS; ZEN 3600, Malvern) is used for the measurements of hydrodynamic diameters of the particles. Transmission electron microscopy (TEM; JEOL 3011) is employed to observe the internal structure of TiO₂ particles. Resonance Raman spectra of the CNT were taken with a Dimension-P1 Raman system (Lambda Solutions, Inc.) with 532 nm excitation. The laser power is 20 mW and the spot size is \sim 25 μ m at 50 \times magnification.

2. EDX spectrum

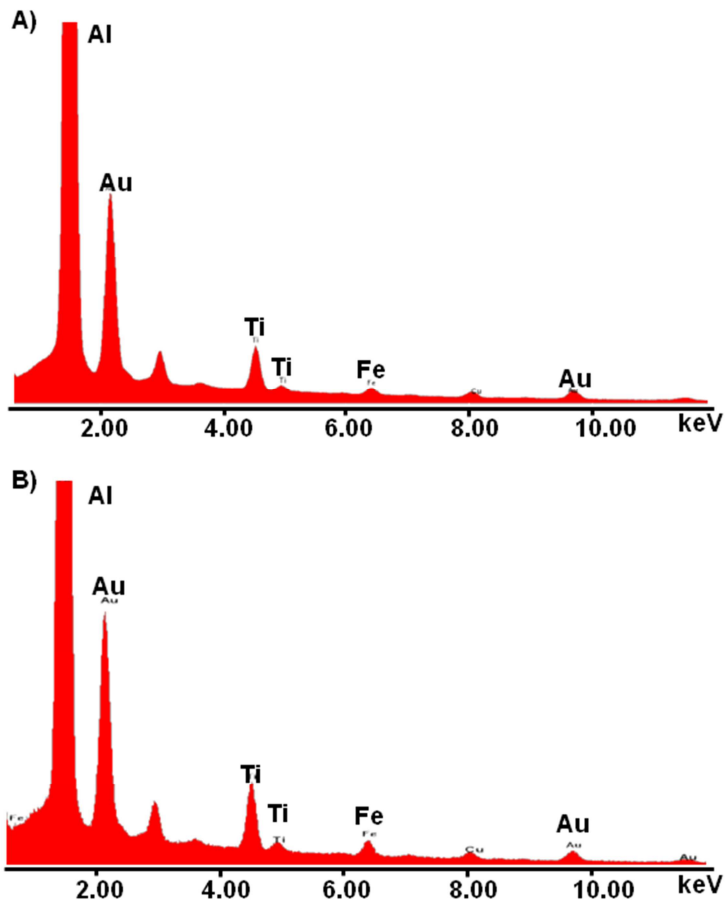


Figure S1. EDX spectrum of Janus particles A) before calcination (Figure 1E) and B) after calcination (Figure 4): Al and Au came from substrate and sputtering procedure, respectively.

3. TGA profile of PLGA-TTBO nanoparticles

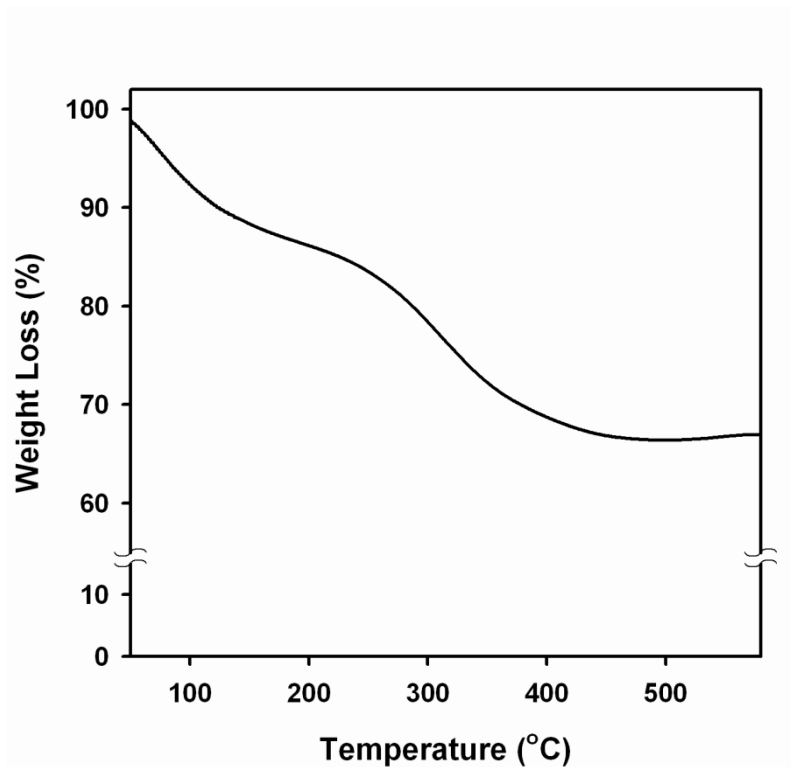


Figure S2. TGA thermogram of PLGA-TTBO composite particles (under air atmosphere, ramp 10 °C/min)

4. Different porosity of nanoparticles after calcination

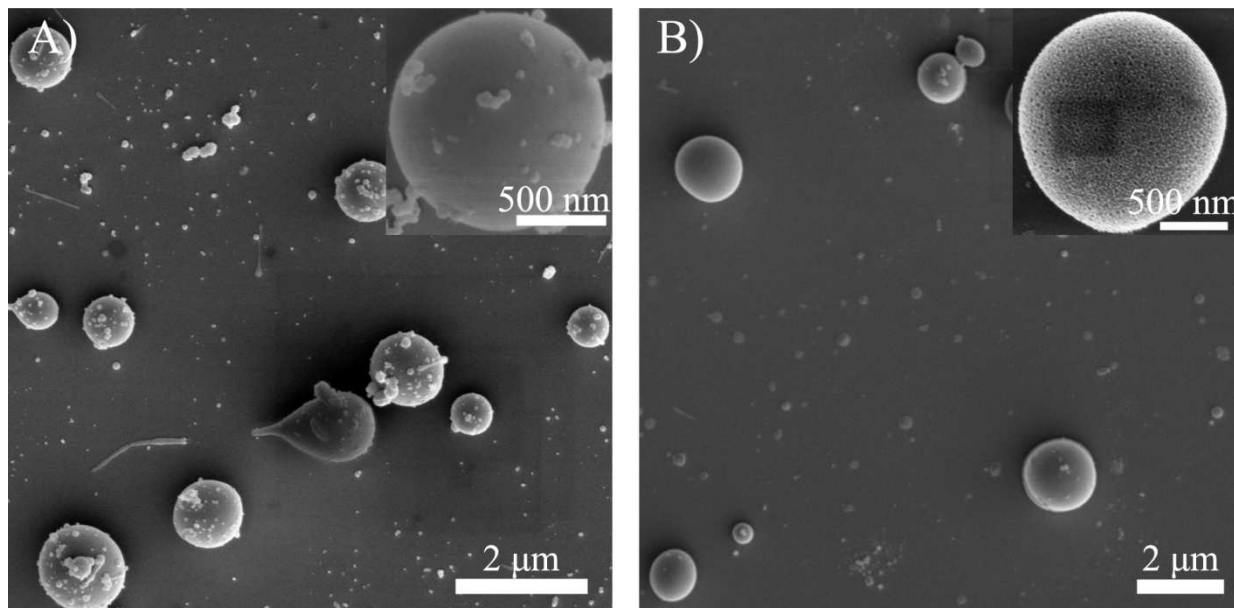


Figure S3. SEM image of calcinated nanoparticles originated from different titania precursor A) TTIP (titanium(IV) isopropoxide), and B) TTBO (same with Figure 3).

5. Raman spectrum of CNT

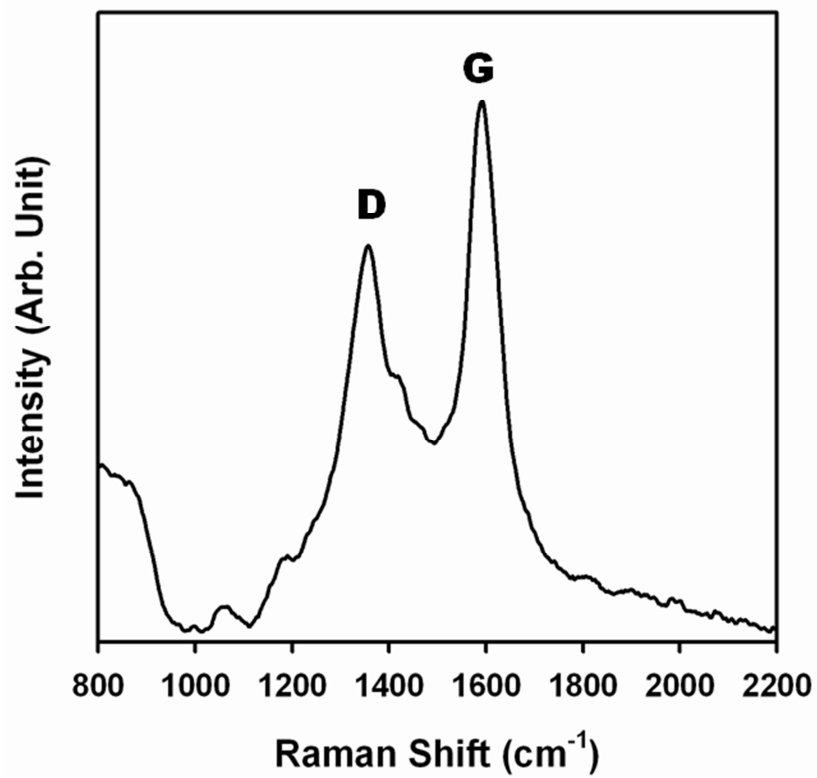


Figure S4. Raman spectrum of CNT grown from Janus catalysts.