Supporting information

In-Situ Microfluidic Fabrication of Multi-Shape Inorganic/Organic Hybrid Particles with Controllable Surface Texture and Porous Internal Structure

Guannan Tang, Wenxiu Li, Xiaodong Cao, Hua Dong*

(1) Microfluidic fabrication of pure PLGA particles

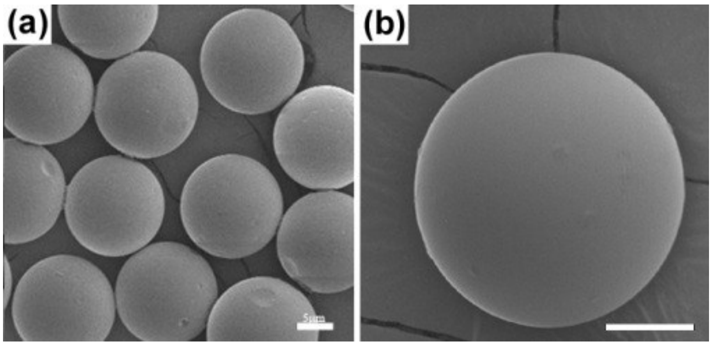

Figure S1. SEM images of pure PLGA particles fabricated in a microfluidic flow-focusing device. PLGA dissolved in dichloromethane were used as the dispersed phase whilst aqueous solution containing 90wt% glycerol and 0.5wt% PVA was used as the continuous phase. Scale bars in (a) and (b) are 5μm and 10μm, respectively.

(2) TG-DSC curves of pure PLGA and TiO_2 particles

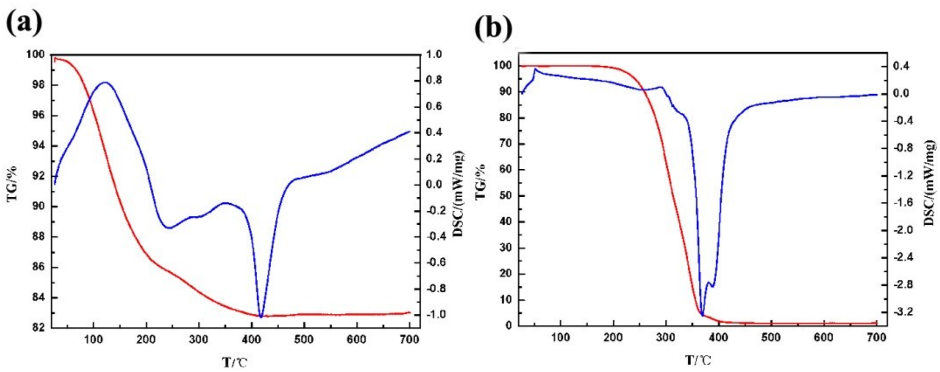

Figure S2. TG-DSC curves of pure (a) TiO_2 and (b) PLGA particles.

(3) Morphology and size of TiO_2 in PLGA/TiO_2 particle

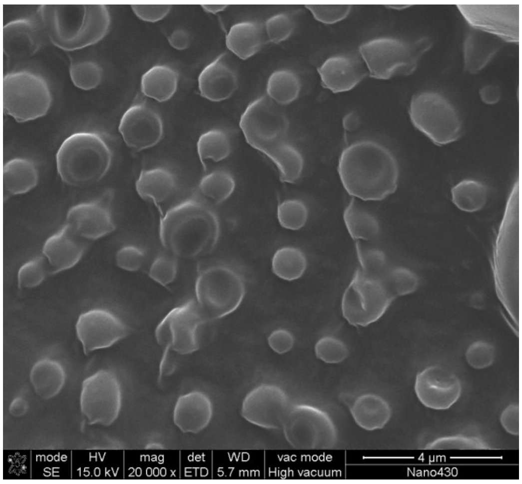

Figure S3. SEM image of TiO_2 after acetone treatment of PLGA/TiO_2 particle

(4) Porous internal structure of PLGA/TiO_2 particles

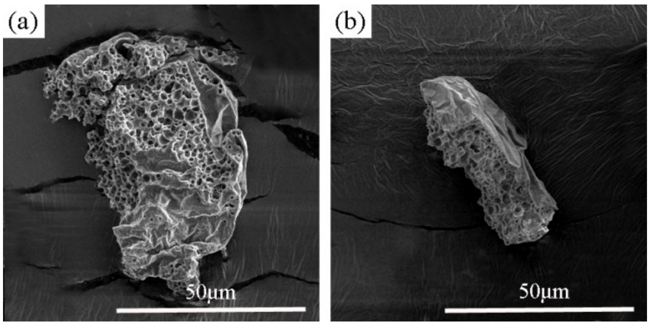

Figure S4. SEM images of sliced PLGA/TiO_2 particles fabricated with the dispersed phase containing 8 mg/g of TBT and (a) 30mg/g and (b) 50 mg/g of PLGA respectively.

(5) Pore size distribution

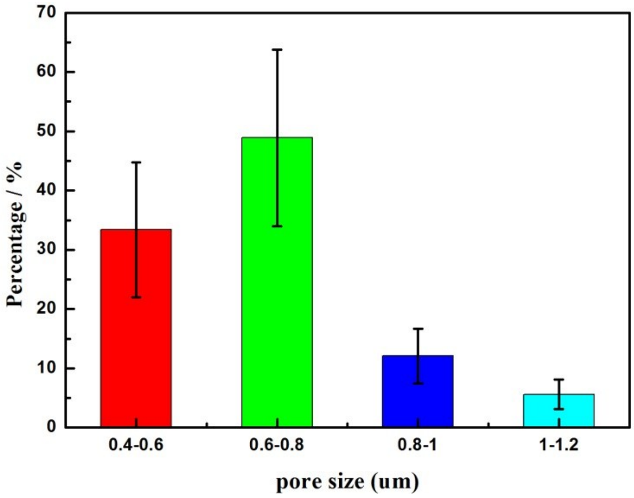

Figure S5. Pore size distribution calculated according to Figure 5b (cross-section of PLGA/TiO_2 particle).

(6) Fabrication of disklike TiO_2 particle

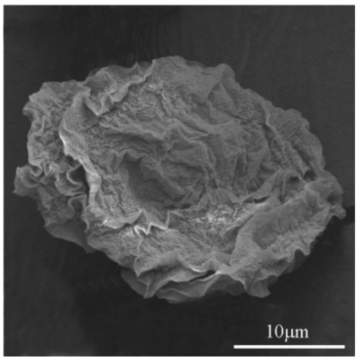

Figure S6. SEM images of disklike TiO_2 particle fabricated with the dispersed phase containing 8mg/g TBT.

(7) Microfluidic fabrication of spherical PCL/TiO_2 particles

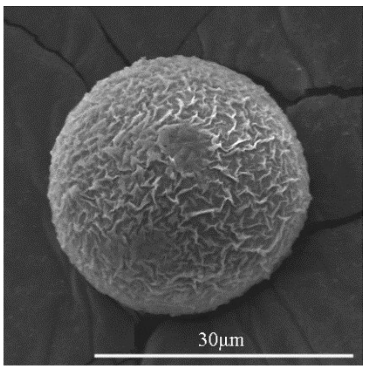

Figure S7. SEM images of PCL/TiO_2 particles fabricated using the dispersed phase containing 8mg/g TBT and 30mg/g PCL. The continuous phase was aqueous solution containing 90wt% glycerol and 0.5wt% PVA, and the collection solution was 2% PVA aqueous solution.

(8) EDS analysis on the cross-section of $PLGA/TiO_2$ particle

Table S1. EDS data measured on the cross-section of $PLGA/TiO_2$ particle

Element	O	C	Ti
Weight %	34.18	57.03	8.79
Atom%	30.23	67.18	2.6

(9) Measurement of contact angle and calculation of interfacial tension

Table S2. Contact angle as a function of n-butanol concentration in the continuous phase

Continuous phase	0.5wt% PVA aqueous solution	0.5wt% PVA +0.8wt% n-butanol	0.5wt% PVA +1.6wt% n-butanol	0.5wt% PVA +2.4wt% n-butanol
Contact angle	64.8	54.2	47.0	36.7

As can be found, the contact angle decreases with the increase in the concentration of n-butanol. According to Young Equation:

$$\gamma_{sg} = \gamma_{sl} + \gamma_{gl} cos\theta$$

The interfacial tension between the PLGA/TBT mixture (actually it should be $PLGA/TiO_2$ film because TBT hydrolyzes very fast on the PLGA/TBT surface) and n-butanol can be calculated as:

$$\gamma_{sl} = \gamma_{sg} - \gamma_{gl} cos\theta$$

Assume that γ_{gl} is constant, γ_{sl} decreases with the decrease in contact angle. So the interfacial tension is decreased with the addition of n-butanol.