

Supplementary Materials: Characteristics of Carbon Material Formation on SBA-15 and Ni-SBA-15 Templates by Acetylene Decomposition and Their Bioactivity Effects

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1. SEM Scattering

The surfaces of SBA-15, Ni-SBA-15 and decomposed carbon were examined using a JEOL JSM-6700F field emission SEM (Peabody, MA, USA) operated at 1–2 kV.

Some SEM scattering photos were presented in Figures S1-a and S1-b. At 650 °C, some carbon-like soot covered the surface of SBA-15, and little spherical carbon formation occurred after the acetylene decomposition. The spherical carbon materials were formed at 750 °C (Figure S1-a(3-1,3-2)) and 850 °C (Figure S1-a(4-1,4-2)), and their diameters were 0.5–0.9 µm and 0.35–0.9 µm, respectively. There was an insignificant difference in the diameters of the spherical carbon materials.

For Ni-SBA-15 support, some filament-shaped carbon materials were formed at 650 °C (Figure S1-b(2-1,2-2)). At 750 °C (Figure S1-b(3-1,3-2)) and 850 °C (Figure S1-b(4-1,4-2)), spherical (0.8–1.0 µm in diameter) and filament (150 nm in diameter) carbon materials were formed on the support, but the spherical carbon materials were in the majority.

2. TEM Scattering

A high-resolution transmission electron microscope (HR-TEM, JEOL JEM-2010, Tokyo, Japan) was employed to examine the visualized structure of materials and operated at an accelerated voltage of 200 kV. The TEM scattering photos are shown in Figures S2-a and S2-b.

No filament or spherical shapes of carbon materials formed on the SBA-15 at 650 °C. Spherical carbon materials were observed, and their diameters were 0.8–1.1 µm and 0.8–0.9 µm at 750 °C (Figure S2-a(3-1,3-2)) and 850 °C (Figure S2-a(4-1,4-2)), respectively. There were spheres (0.7–0.8 µm) and filaments (60–130 nm) of carbon material formation at 650–850 °C (Figure S2-b).

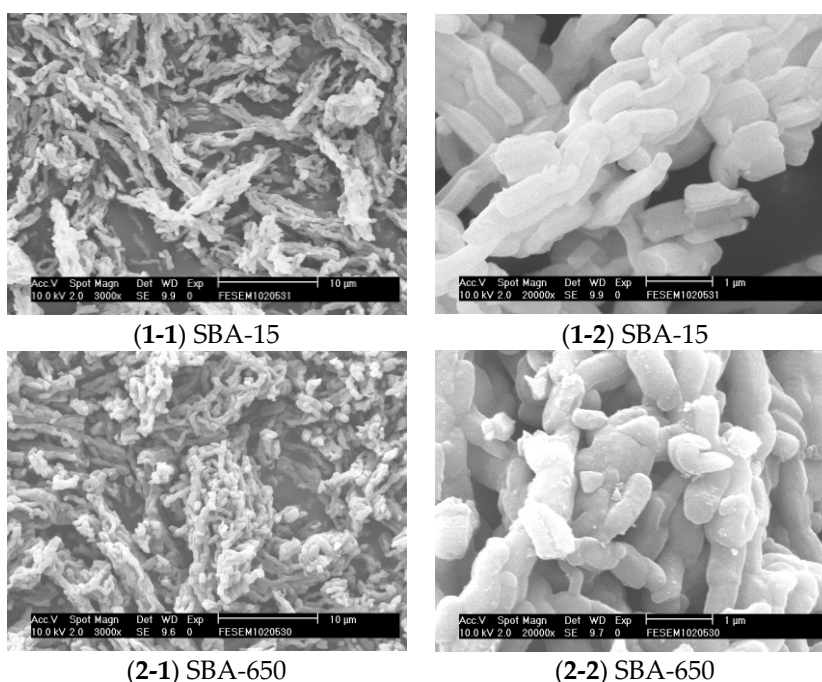


Figure S1-a. Cont.

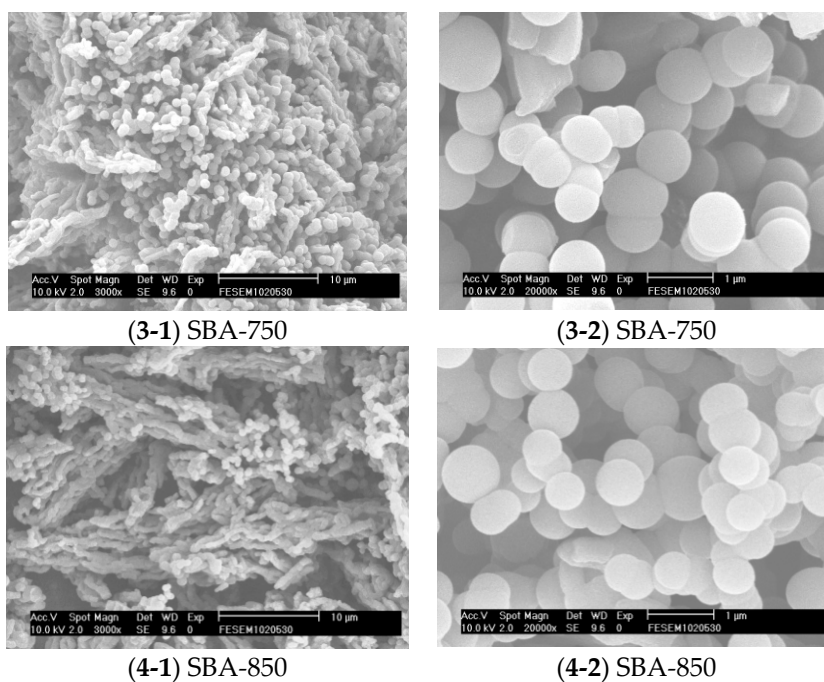


Figure S1-a. SEM photos of SBA-15, and carbon material formation on SBA-15.

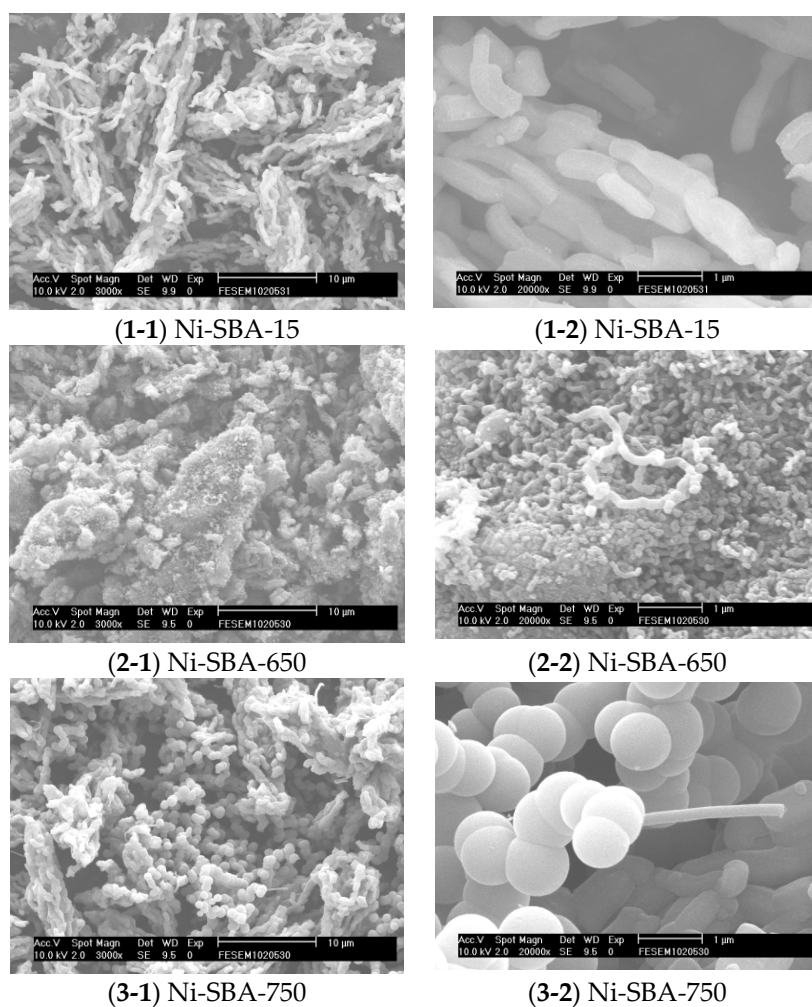
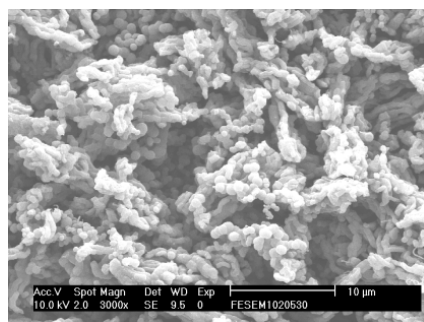
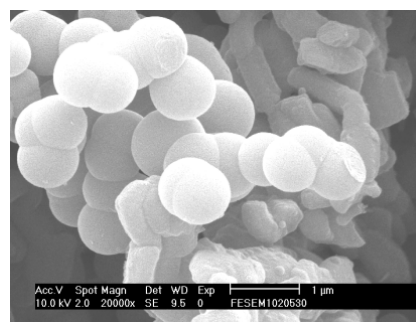


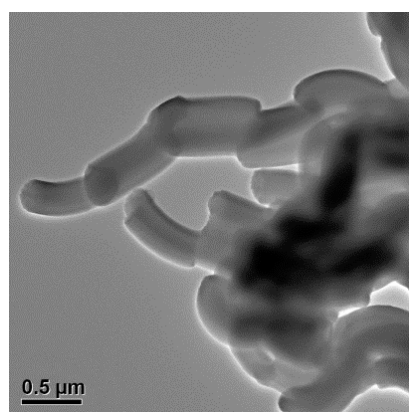
Figure S1-b. Cont.



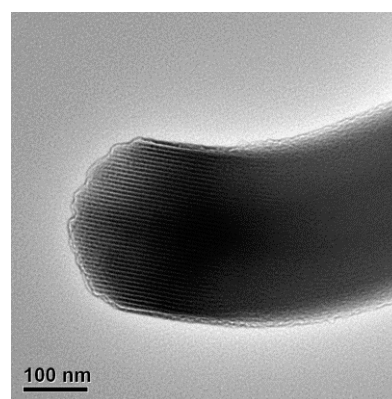
(4-1) Ni-SBA-850



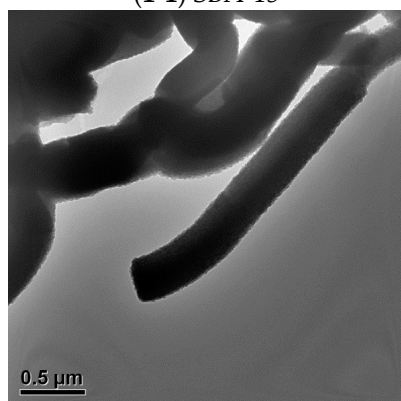
(4-2) Ni-SBA-850

Figure S1-b. SEM photos of Ni-SBA-15 and carbon material formation on Ni-SBA-15.

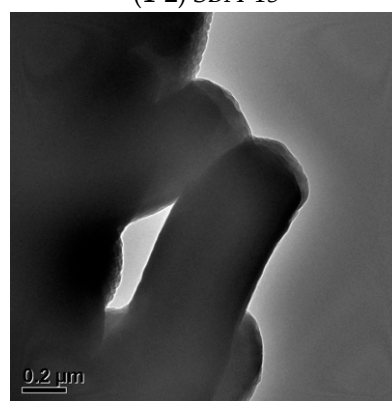
(1-1) SBA-15



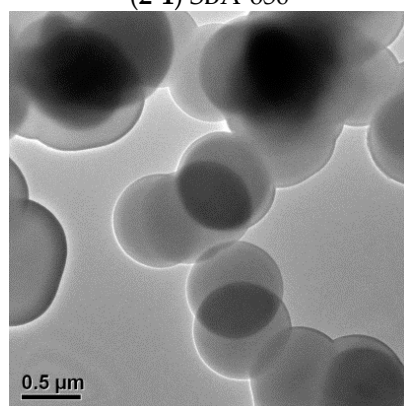
(1-2) SBA-15



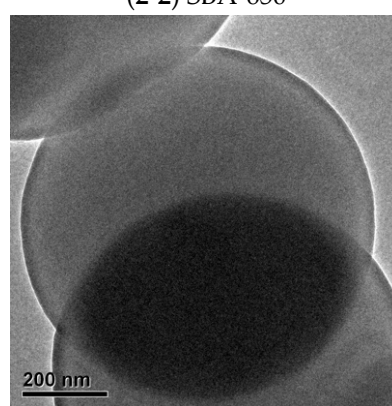
(2-1) SBA-650



(2-2) SBA-650

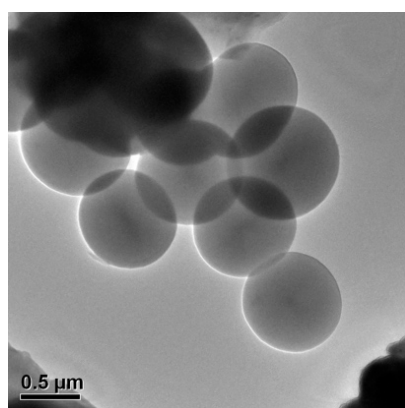


(3-1) SBA-750

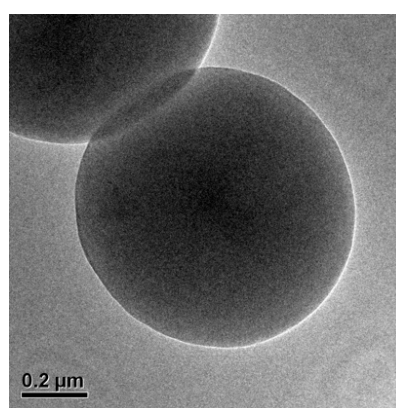


(3-2) SBA-750

Figure S2-a. Cont.

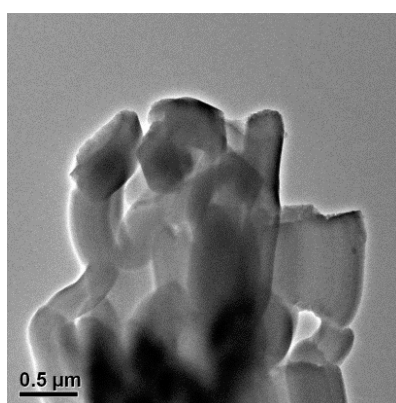


(4-1) SBA-850

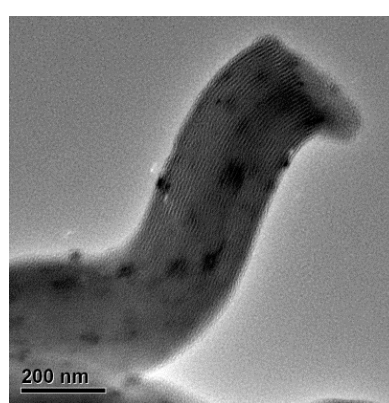


(4-2) SBA-850

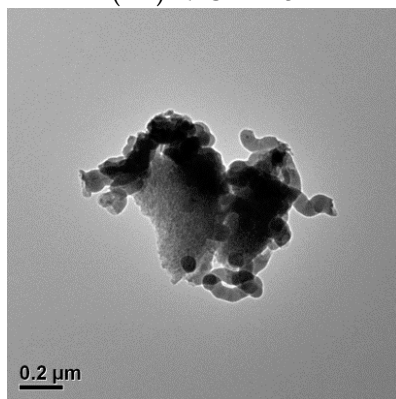
Figure S2-a. TEM photos of SBA-15, and carbon material formation on SBA-15.



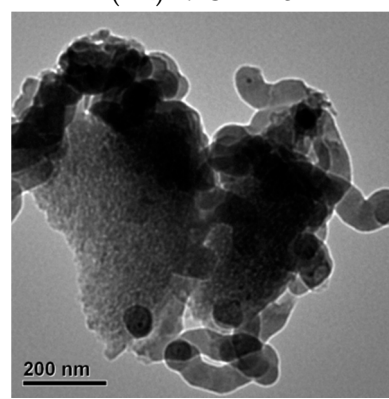
(1-1) Ni-SBA-15



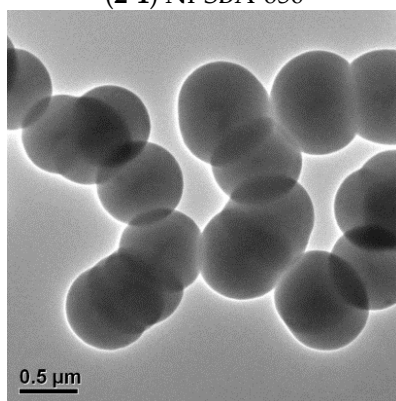
(1-2) Ni-SBA-15



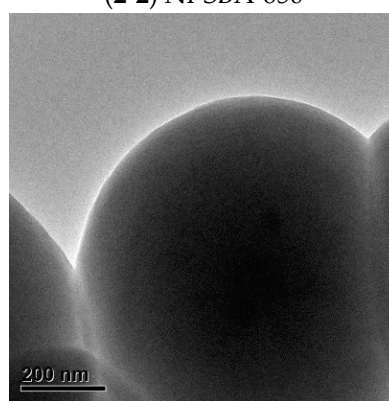
(2-1) Ni-SBA-650



(2-2) Ni-SBA-650



(3-1) Ni-SBA-750



(3-2) Ni-SBA-750

Figure S2-b. *Cont.*

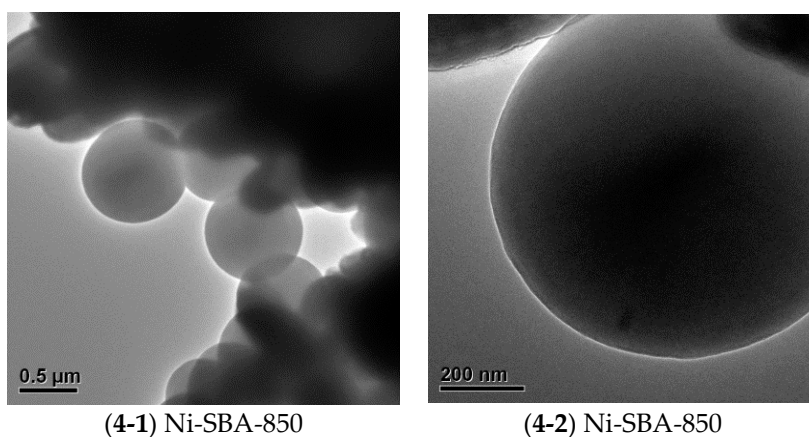


Figure S2-b. TEM photos of Ni-SBA-15 and carbon material formation on Ni-SBA-15.