Supporting Information

Pd/CNT-SiC monolith as a robust catalyst for Suzuki coupling reaction

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Experimental

Synthesis of CNT-SiC monolith

SiC foam was produced by a method of macromolecule pyrogenation.1 A slurry solution was prepared by adding resin, SiC powder and silicon powder into ethanol. The plastic foam was then soaked in the solution. After the foam composite was dried and solidified, it was pyrolyzed and sintered under Ar atmosphere and SiC foam was obtained. The iron-containing washcoat/SiC foam was prepared by coating a thin iron-containing washcoat on SiC foam by a feasible method. In this method, 2 g of Fe(NO₃)₃·9H₂O, 45 g of urea, 4.7 g of Al(NO₃)₃·9H₂O, and 6.4 g of Mg(NO₃)₂·6H₂O were added into 250 ml of deionized water in a flask. After mixed well, 10 g of SiC foam was immersed into above solution. After stirring for 10 h at 90 °C and staying at 100 °C for 12 h without stirring, SiC foam was taken out and dried at 110 °C for 12 h. And the product was collected for next experiments.

The as-prepared iron-containing washcoat/SiC foam was then put into a quartz tube reactor in a tubular furnace (supplied by Lindberg Blue M, HTF55342C) for CNT growth with a chemical vapor deposition (CVD) process. In a flow of Ar (200 mL min⁻¹), the furnace was heated to 750 °C. H₂ (40 mL min⁻¹) was then fed into the reactor for 5 min. After that, a flow of C₂H₄ (80 mL min⁻¹) was introduced to grow CNTs for 30 min. After the reaction, the furnace was cooled to room temperature under Ar atmosphere. The residual Fe metal in the synthesized composite material can be efficiently removed by refluxing in 200 mL of concentrated HNO₃ (65%) at 120 °C.
for 2 h. After filtration, fully washing with deionized water was carried out, and then
dried at 110 °C for 12 h. The resulting material was denoted as CNT-SiC monolith
saved for subsequent tests.

**Synthesis of Pd/CNT-SiC monolith**

A mixture solution of H$_2$PdCl$_4$ water and ethanol in 3:1 (volume ratio) was used to
deposit Pd on CNT-SiC monolith by a traditional wet impregnation method. In all the
experiments, the amount of Pd precursor was critically controlled at 0.05 wt%. There
is no Pd lost during the preparation. The product was dried under ambient conditions
overnight, following drying at 60 °C in air for 12 h. The sample was then reduced in
H$_2$ at 300 °C for 3 h. The obtained catalyst was denoted as Pd/CNT-SiC monolith. For
comparison, Pd was loaded on commercial CNTs (provided by Shandong Company)
purified by concentrated HNO$_3$ solution (65%), respectively. The Pd weight loadings
in all the catalysts were 0.05 wt%.

**Characterization**

SEM (Nova NanoSEM 450, FEI) was employed to observe the morphology of
products. Transmission electron microscopy (TEM) was performed by a Tecnai G2
F20 S-TWIN electron microscope operated at 120 kV. Raman spectroscopy was
tested by a LabRam HR 800 using a 632.8 nm laser. Thermogravimetric (TG)
analysis was carried out using a NETZSCH STA 449 F3 under a flow of air (50 mL
min$^{-1}$) with a heat ramp of 10 °C min$^{-1}$. XPS experiments were carried out by using
ESCALAB 250.

**Catalytic performance test**

Suzuki cross-coupling reaction was conducted in a flask in the presence of 5 mmol
iodobenzene, 10 mmol phenylboronic acid, K$_3$PO$_4$·3H$_2$O (20 mmol), 5 mL water, 20
mL ethanol, and 600 mg catalysts at 60 °C under reflux conditions. The reaction was
monitored by gas chromatography (Agilent 7890A) with FID and TCD.
**Figure S1.** (a, b) SEM images of the initial SiC foam.

**Figure S2** (a, b) STEM images of Pd/CNT-SiC monolith.

**Figure S3.** The survey XPS spectrum of Pd/CNT-SiC monolith.