
One-Pot Pyrolysis to N-Doped Graphene with High-Density Pt Single Atomic Sites as Heterogeneous Catalyst for Alkene Hydrosilylation

Hydrosilylation of Alkenes Catalyzed by Platinum on N-Doped Graphene

**Significance:** Single-atom platinum catalyst supported on N-doped graphene (Pt-ISA/NG) was prepared by heating a mixture of an EDTA–Pt complex and Na₂CO₃ at 850 °C for one hour, followed by removal of the Na₂CO₃ with dilute HCl (eq. 1). Pt-ISA/NG catalyzed the hydrosilylation of alkenes with triethoxysilane to give the corresponding silylated alkanes in ≤99% conversion and ≤99% selectivity (eq. 2).

**Comment:** The authors have previously reported the preparation of the EDTA–Pt complex (Nano Res. 2018, 11, 3088). In the hydrosilylation of octan-1-one with triethoxysilane, Pt-ISA/NG was reused four times without significant loss of its catalytic activity. TEM, EDX, HAADF-STEM, and EXAFS studies on the recovered Pt-ISA/NG indicated that the structural and electronic integrity of Pt-ISA/NG was maintained under the reaction conditions.

**Equation (1):**

\[
\text{EDTA-Pt complex} + \text{Na₂CO₃} \xrightarrow{850 °C, 1 h} \text{Pt-ISA/NG} \quad (1)
\]

**Equation (2):**

\[
R \equiv + \text{HSi(OEt)₃} + \text{Pt-ISA/NG (0.25 mol%)} \xrightarrow{40–80 °C, 2–18 h} R \equiv \text{Si(OEt)₃} \quad (2)
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