Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supplementary Information

MOF derived high-density atomic platinum heterogeneous catalyst for C-H bond activation

Zhuang et al.

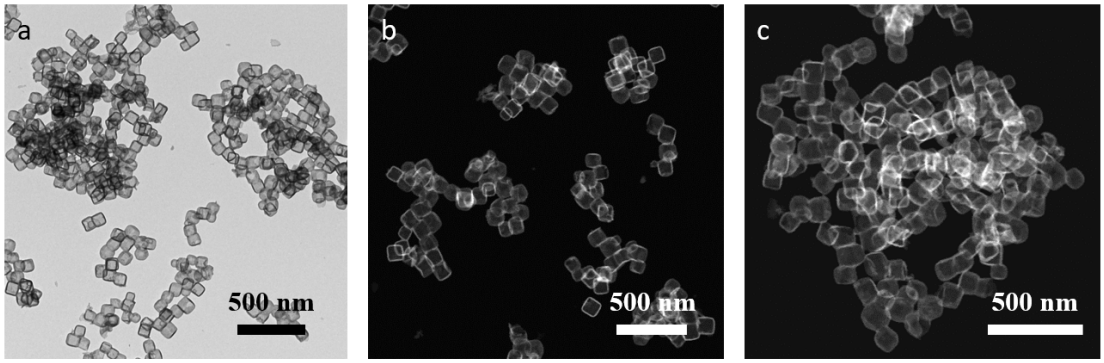


Figure S1. (a) TEM image of A-Pt NBs. (b), (c) HRTEM dark field images of A-Pt NBs.

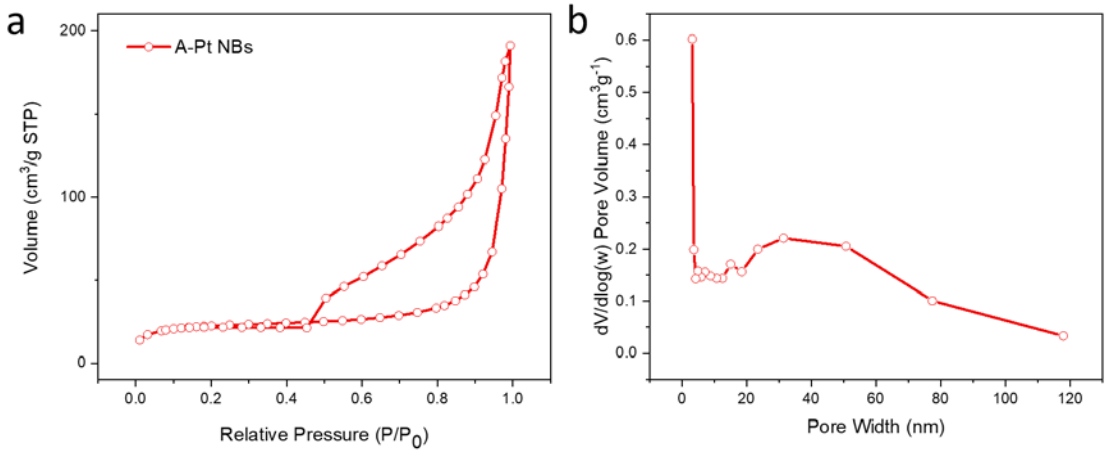


Figure S2. (a) Nitrogen adsorption-desorption isotherms of A-Pt NBs. (b) BJH Desorption dV/dlog(w) pore distribution of A-Pt NBs.

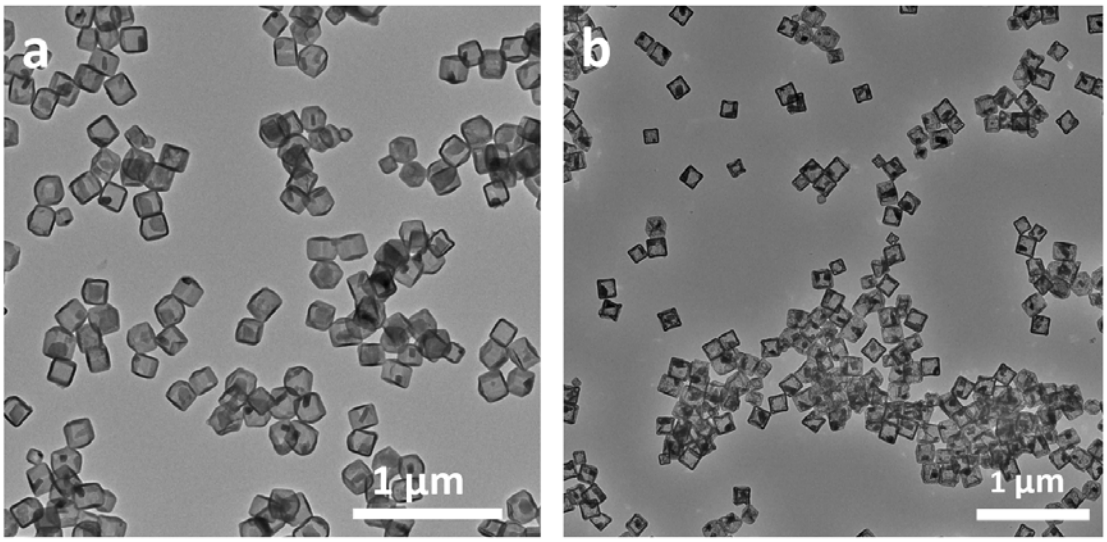


Figure S3. The TEM images of (a) Au-nanoboxes and (b) Pd-nanoboxes.

When the 0.1 mmol K_2PtCl_4 was replaced by 0.075 mmol $NaAuCl_4 \cdot 2H2O$ and 0.075 mmol Na_2PdCl_4 in the solvothermal reaction, the Au-nanoboxes and Pb-nanoboxes can be obtained. As shown in the Fig R5, both Au-nanoboxes and Pb-nanoboxes exhibited similar hollow structure and the ZnO interior core as the Pt system.

Elements	at% (XPS)	wt% (XPS)	wt% (ICP-OES)
C	56.82	26.31	-
N	20.64	11.14	-
O	11.57	7.13	-
Cl	2.99	4.09	-
Zn	1.75	4.41	4.66
Pt	6.24	46.92	47.38

Table S1. XPS and ICP-OES elemental analysis results of A-Pt NBs.

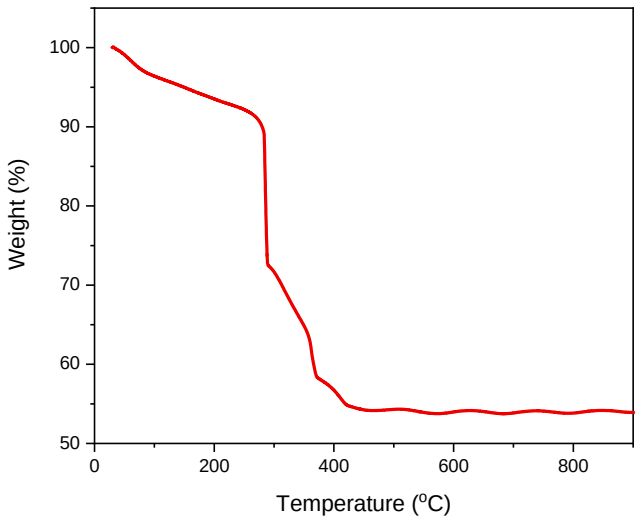


Figure S4. TGA profile of A-Pt NBs.

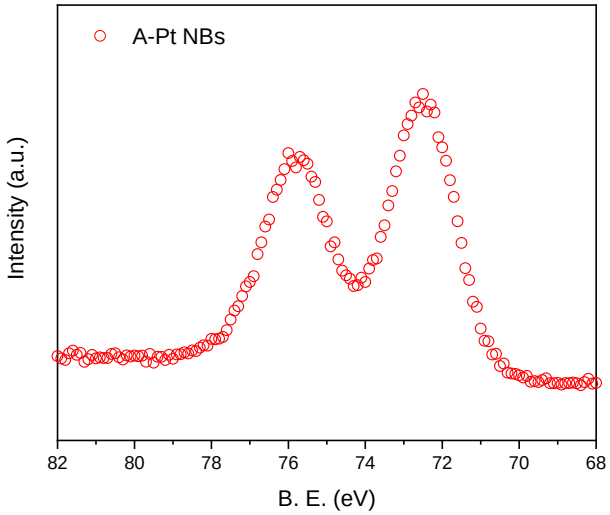


Figure S5. XPS spectra of A-Pt NBs.

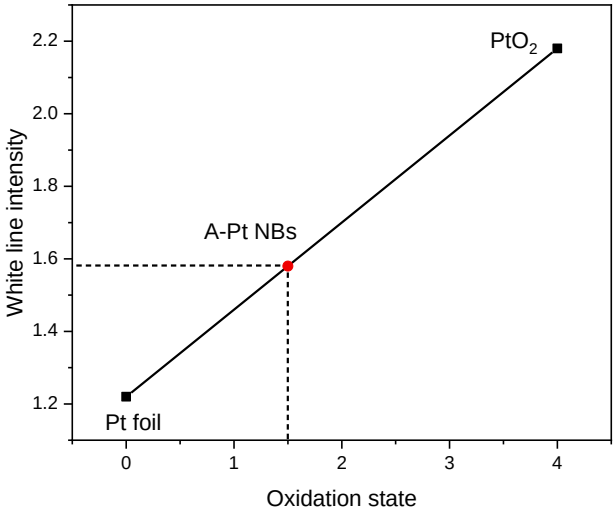


Figure S6. The semi-quantitative analysis based on the white line intensity of XANES for A-Pt NBs.

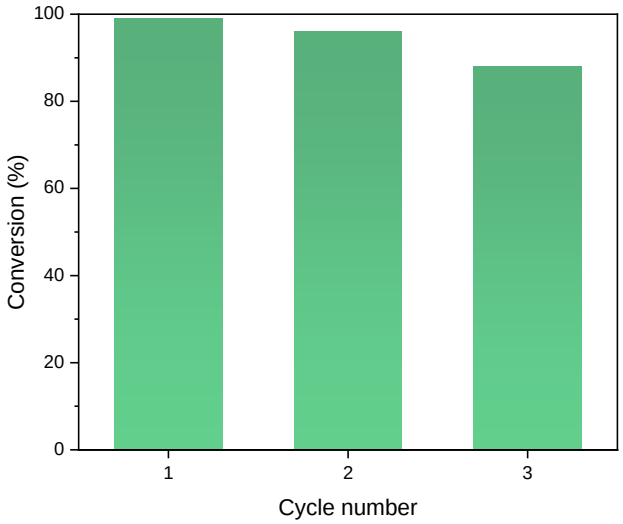


Figure S7. Recycling test of A-Pt NBs for the C-H bond borylation of arenes.

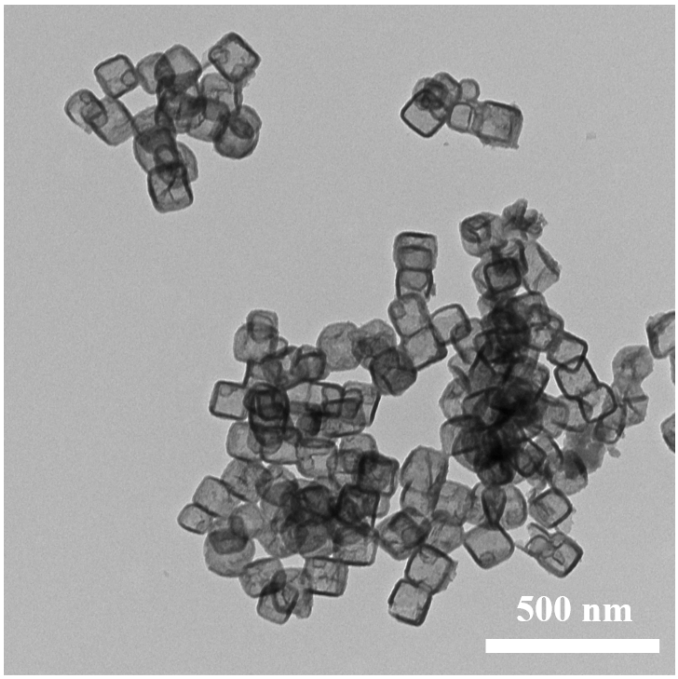


Figure S8. TEM images of catalysts obtained after catalytic tests.

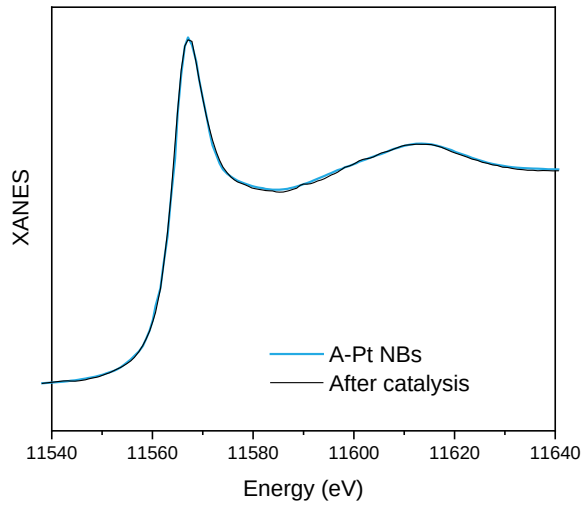
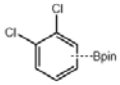
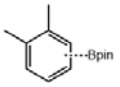
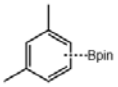


Figure S9. XANES of A-Pt NBs and catalysts obtained after three catalytic cycles.

Entry	Substrate	Product	Conversion (%)
1			94
2			83
3			45
4			68
5			54
6 [a]			98
7			95

a. The reaction was under N_2.

Figure S10. C-H bond borylation of various arenes with A-Pt NBs.