# Supporting Information

## Synthesis of Intermetallic Pt-based Catalysts by Lithium - Naphthalenide - Driven Reduction for Selective Hydrogenation of Cinnamaldehyde

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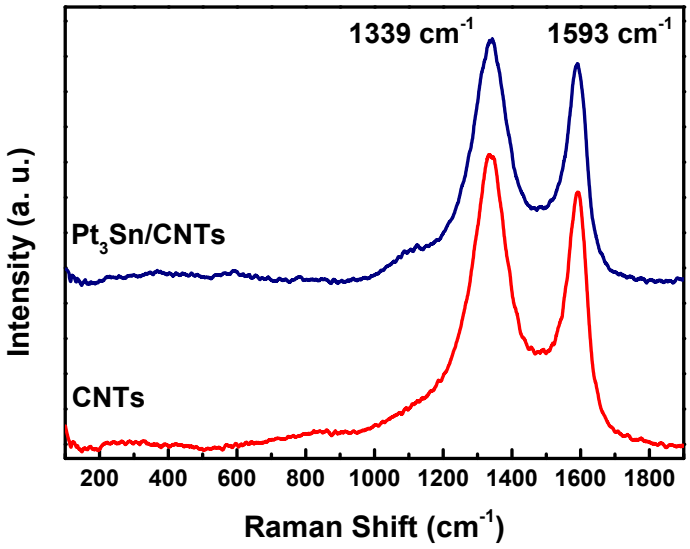


**Figure S1** Raman spectra of CNTs with and without depositing $Pt_3Sn$.

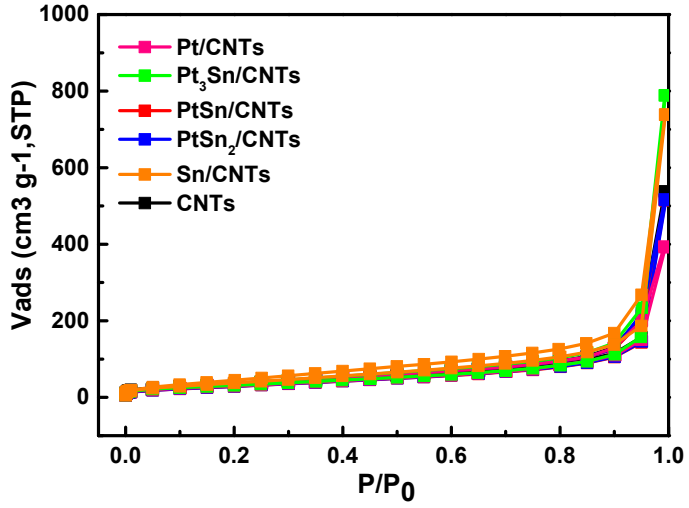


**Figure S2** $N_2$ adsorption-desorption isotherms of CNTs and Pt-Sn/CNTs samples.

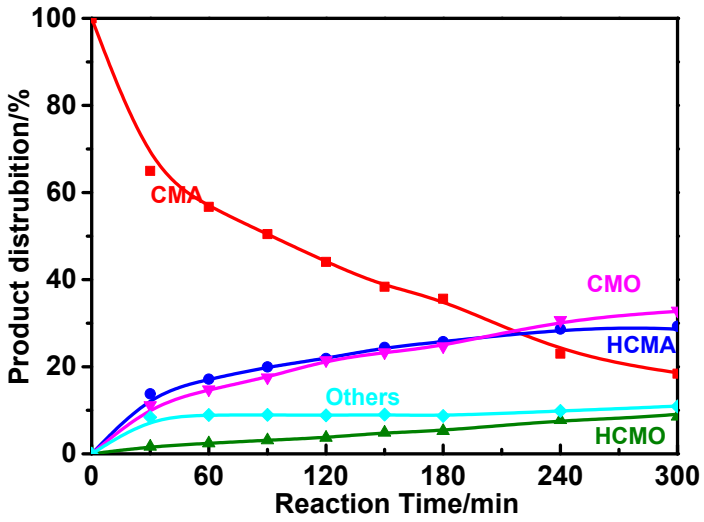


**Figure S3** The variation of the relative concentration with time for the hydrogenation of CMA over $Pt_3Sn$/CNTs catalyst prepared by traditional impregnation method (2 MPa $H_2$, 80 $^oC$).

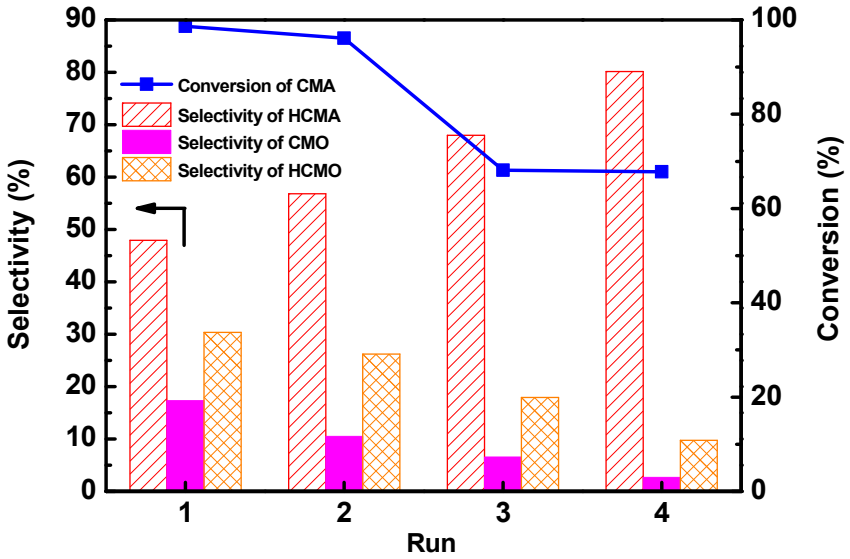


**Figure S4** The stability results of Pt/CNTs catalyst for the hydrogenation of CMA.

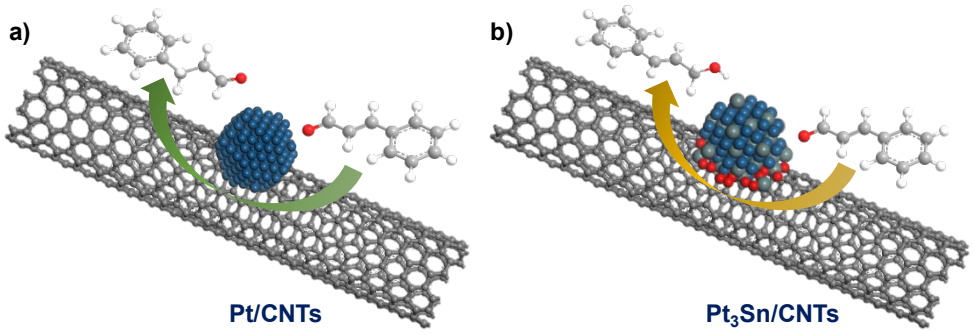


**Figure S5** Schematic representation of the chemoselective hydrogenation of CMA over (a) Pt/CNTs and (b) $Pt_3Sn$/CNTs catalysts prepared by LiNaph-driven reduction.

**Table S1** XPS analysis results of Pt 4*f* and Sn 3*d* spectra in aspreapred Pt-Sn/CNTs samples.

| Catalyst | Relative atomic percentage (%) | | | |
|---|---|---|---|---|
| | $Pt^{0\rightarrow\delta-}$ | Pt-O-Sn | $SnO_x$/Sn | $SnO_2$ |
| Pt/CNTs | 100 | 0 | - | - |
| $Pt_3Sn$/CNTs | 65.6 | 34.4 | 50.7 | 49.3 |
| Pt-Sn/CNTs | 69.6 | 30.4 | 49.3 | 50.7 |
| $PtSn_2$/CNTs | 100 | 0 | 39.6 | 60.37 |
| Sn/CNTs | - | - | 0 | 100 |

**Table S2** ICP-AES results of Pt/CNTs and $Pt_3Sn$/CNTs catalysts.

| Catalyst | Pt loading (wt.%) | | Pt:Sn atom ratios | |
|---|---|---|---|---|
| | Fresh | Spent | Fresh | Spent |
| Pt/CNTs | 0.68 | 0.32 | - | - |
| $Pt_3Sn$/CNTs | 0.53 | 0.49 | 3.13 | 3.06 |