

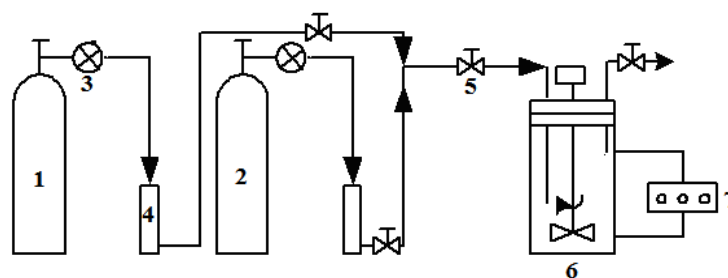
# Supporting Information

## Preparation and application of coconut shell activated carbon immobilized palladium complexes

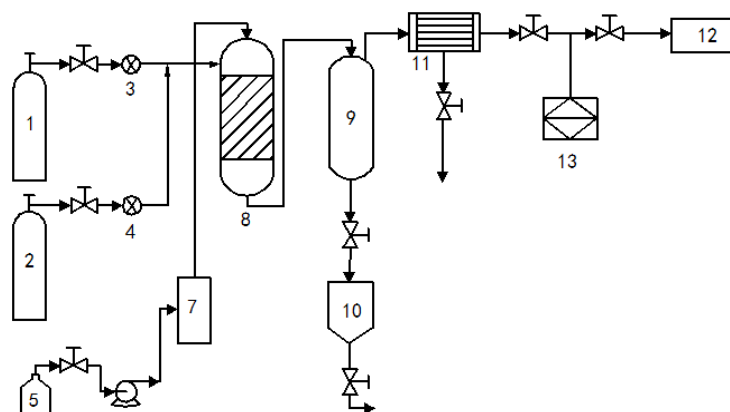
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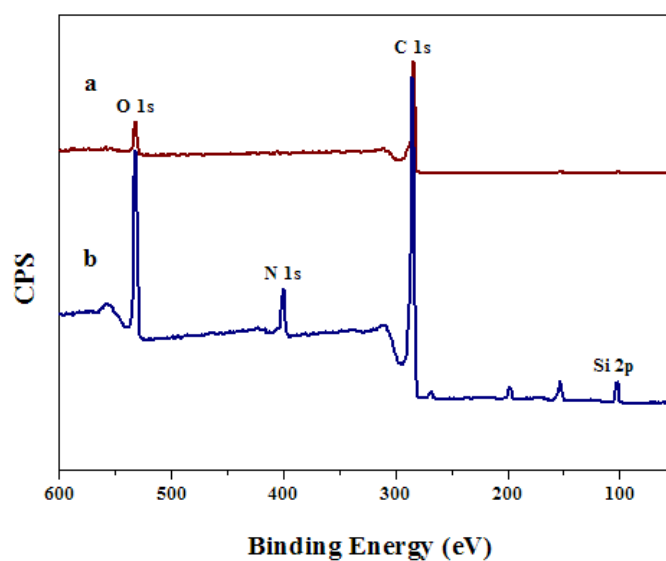
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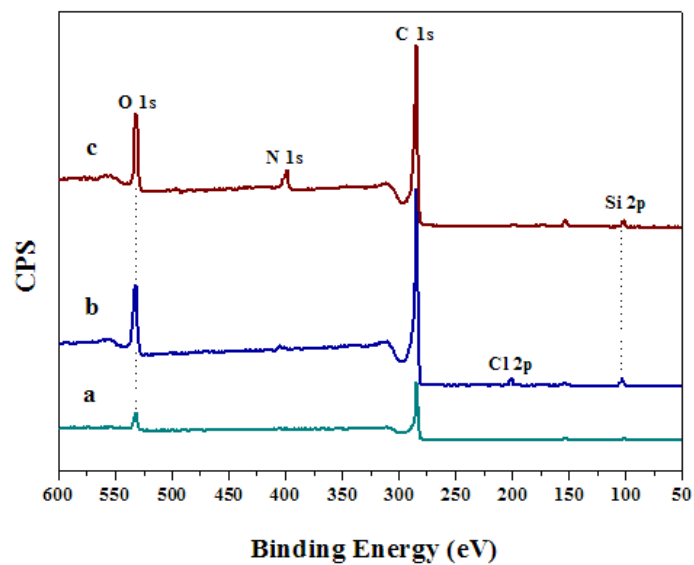
**Fig.S1** Schematic diagram of bath catalytic reaction in a high pressure reaction vessel. 1-CO cylinder; 2-O<sub>2</sub> cylinder; 3-mass flowmeter; 4-dryer; 5-valve; 6-250 mL high-pressure reaction vessel; 7-controller of high-pressure reactor; 8-reactor effluent.



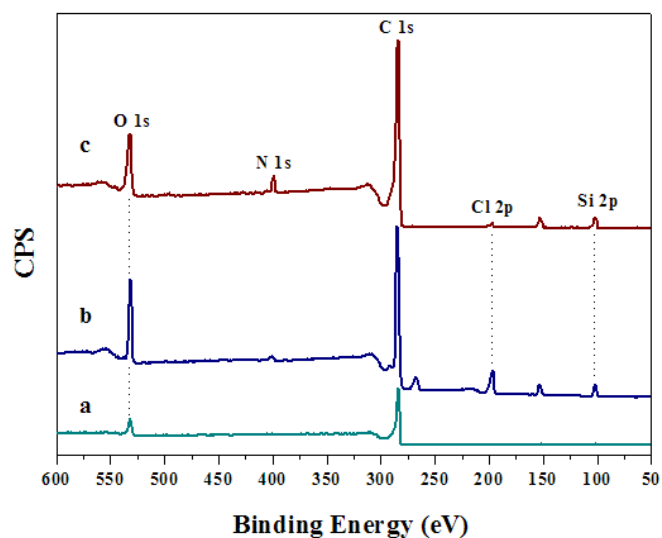
**Fig.S2** Schematic diagram of continuous catalytic reaction in a fixed-bed reactor.  
1-O<sub>2</sub> cylinder; 2-CO cylinder; 3,4-mass flowmeter; 5-raw material tank; 6-metering pump; 7-buffer tank; 8-fixed-bed reactor; 9-gas-liquid separator; 10-bunker; 11-condenser; 12-cistern; 13-gas chromatograph



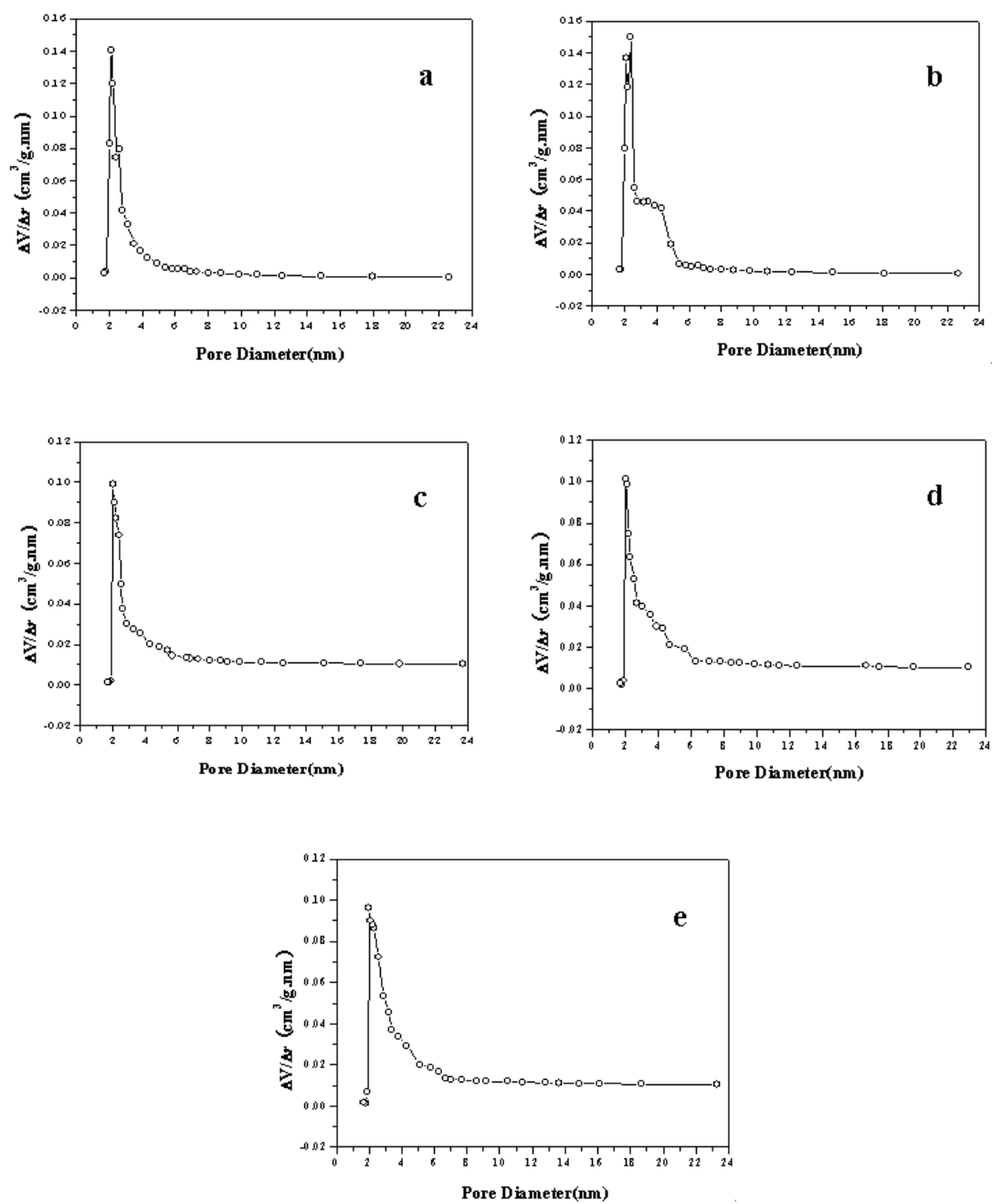
**Fig.S3** XPS spectra of (a) Oxidized CSAC and (b) AEAPTMS silanized CSAC



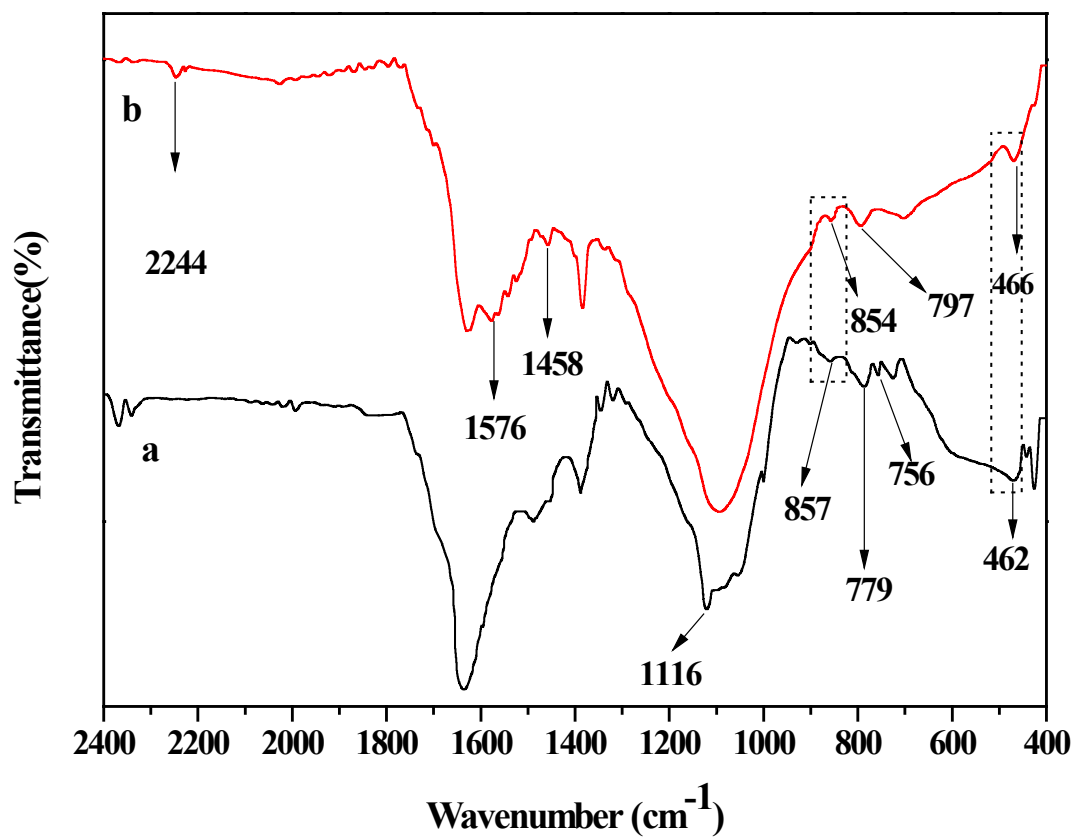
**Fig.S4** XPS spectra of (a) Oxidized CSAC, (b) CMPTCS silanized CSAC and (c) Benzyl malononitrile ligand grafted CSAC.



**Fig.S5** XPS spectra of (a) Oxidized CSAC, (b) CPTMS silanized CSAC and (c) Propyl malononitrile grafted CSAC.



**Fig. S6** Pore size distributions of (a ) Raw CSAC, (b) Oxidized CSAC, (c) Ethylenediamine complexed  $\text{Pd}^{2+}$  catalyst, (d) Benzyl malonitrile complexed  $\text{Pd}^{2+}$  catalyst and (e) Propyl malonitrile complexed  $\text{Pd}^{2+}$  catalyst.



**Fig.S7** FT-IR spectra of catalysts after 75 h catalytic performance in packed bed. (a) Ethylenediamine complexed catalyst, (b) Benzyl malononitrile complexed catalyst