

## Supporting Information

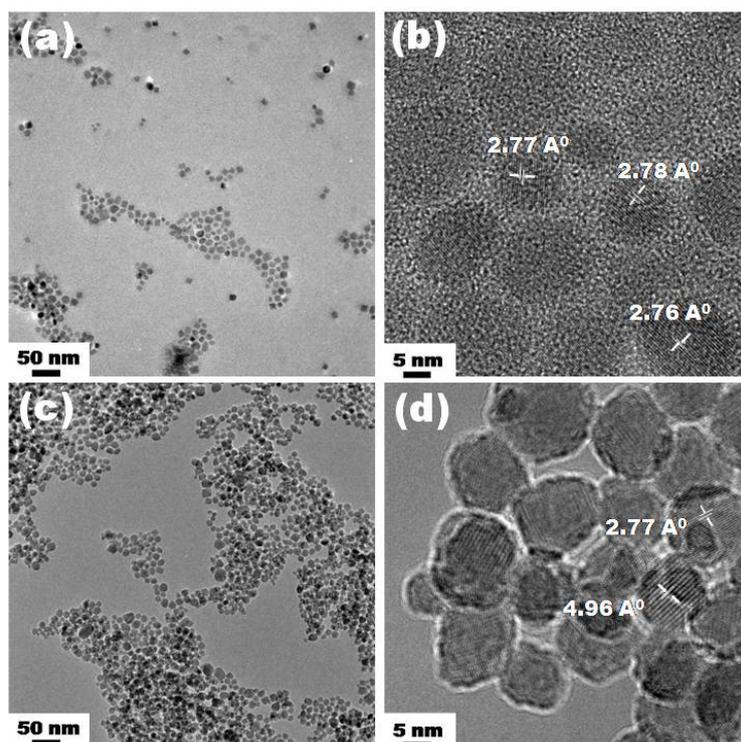
### **Hollow Silica Nanosphere Having Functionalized Interior Surface with Thin Manganese Oxide Layer: Nanoreactor Framework for Size-Selective Lewis Acid Catalysis**

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and In Su Lee\*

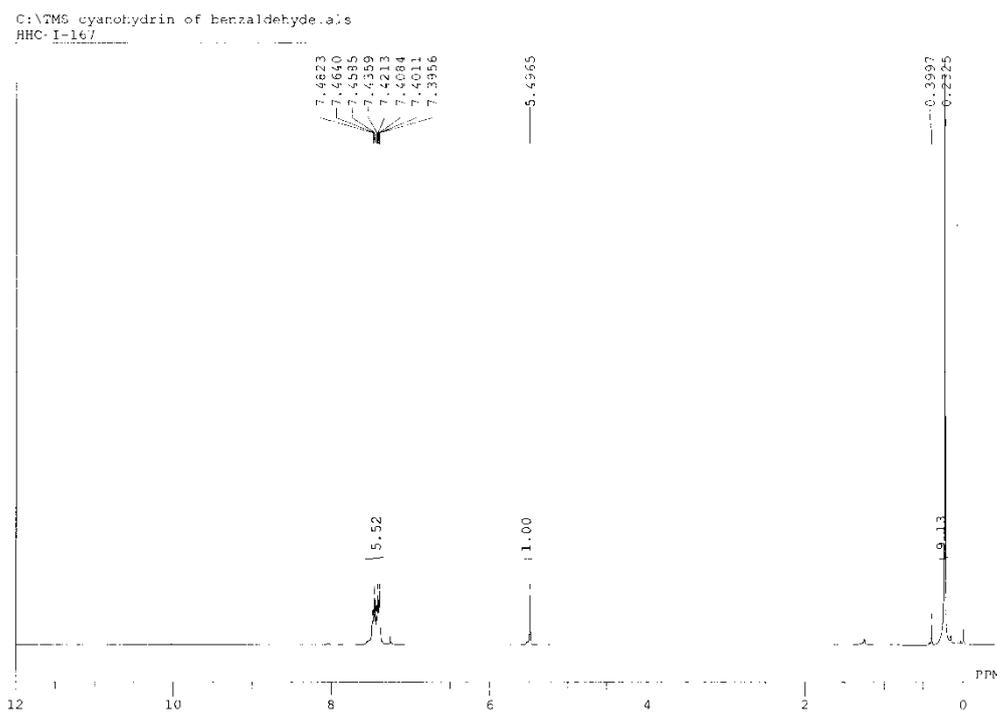
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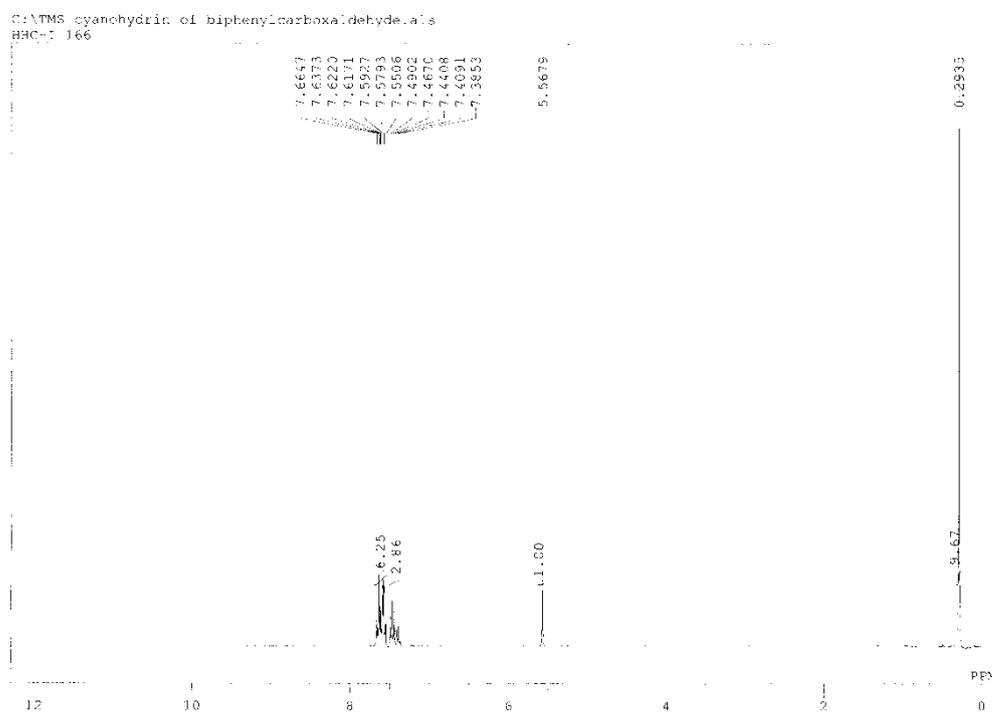
*J. Mater. Chem.*



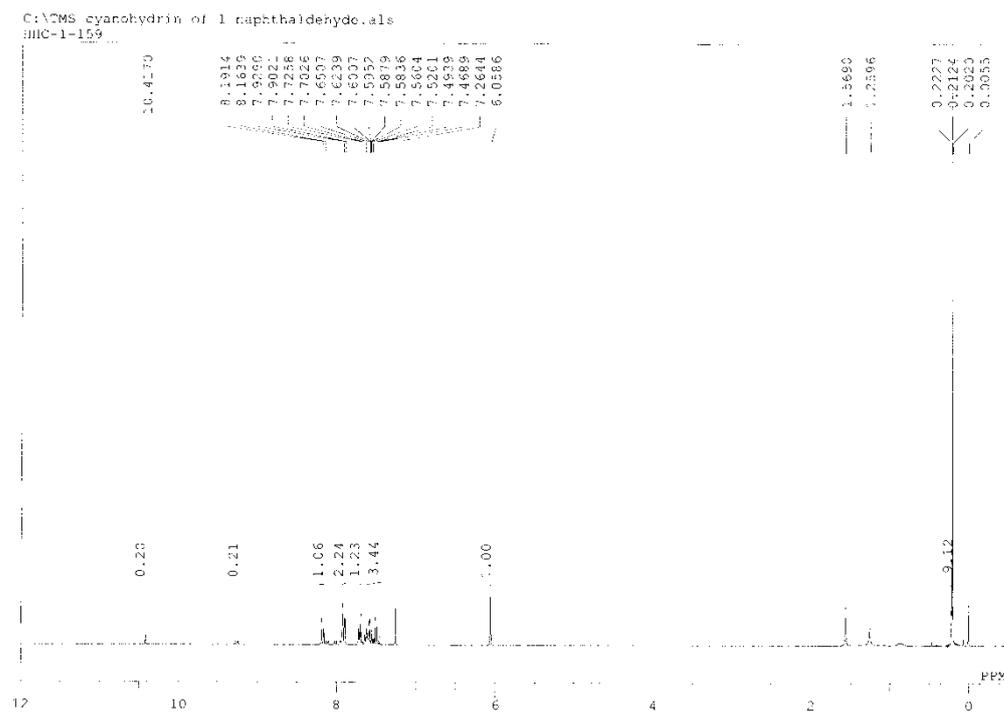
**Figure S1.** TEM and HRTEM images of  $Mn_3O_4$  nanoparticles (a, b) before and (c, d) after treatment with a hydroxylamine solution.



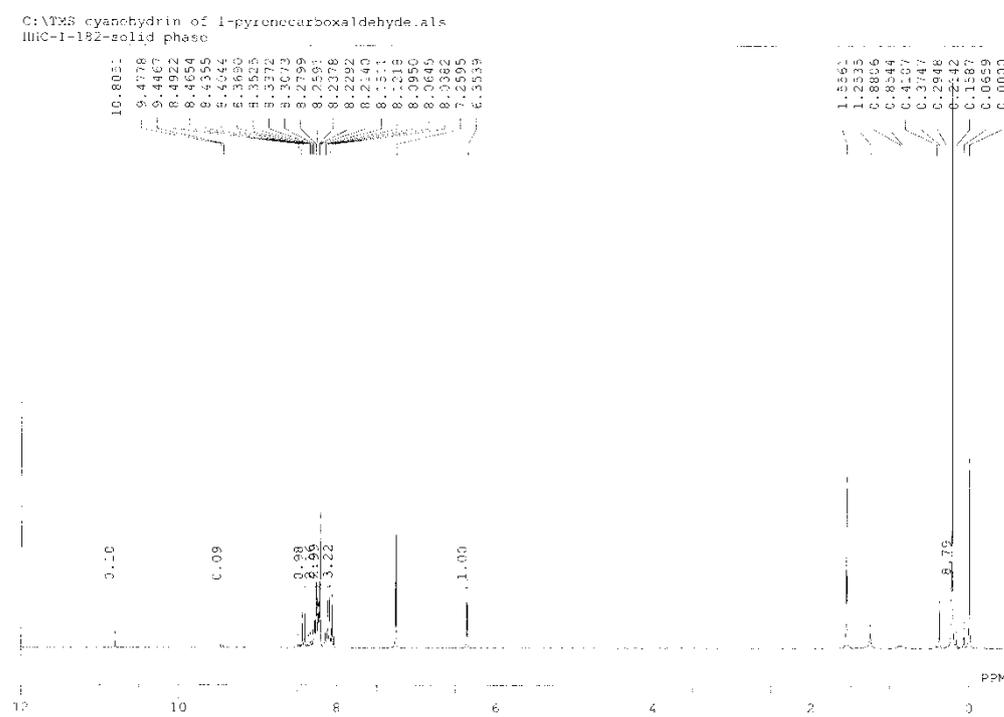
(a)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of benzaldehyde **3a** with catalyst **1**.



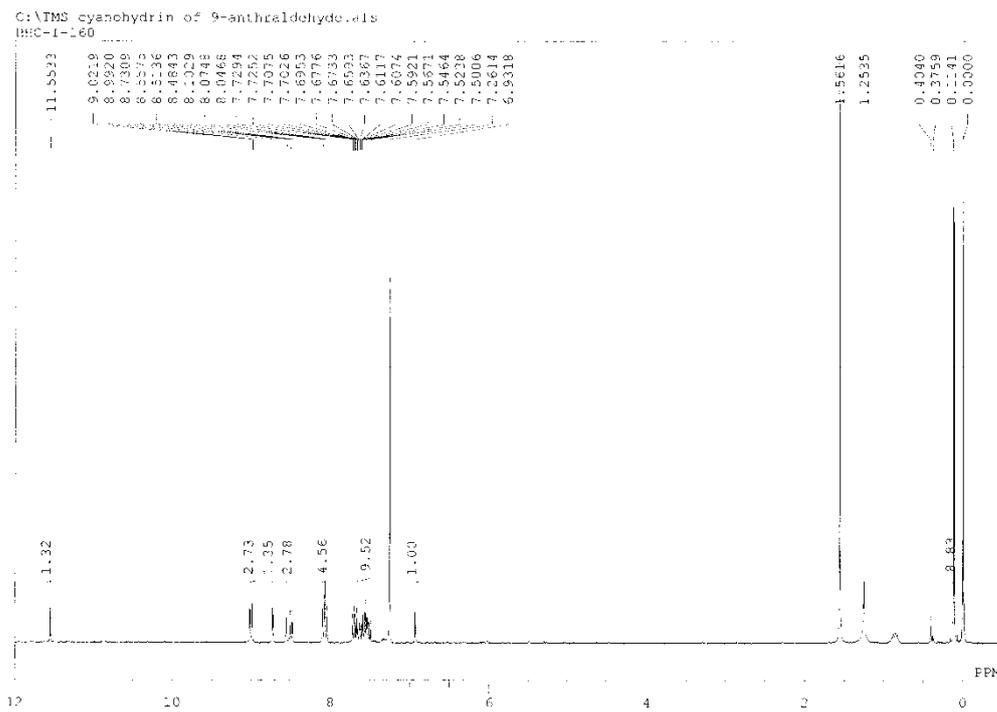
(b)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of biphenyl-4-carboxaldehyde **3b** with catalyst **1**.



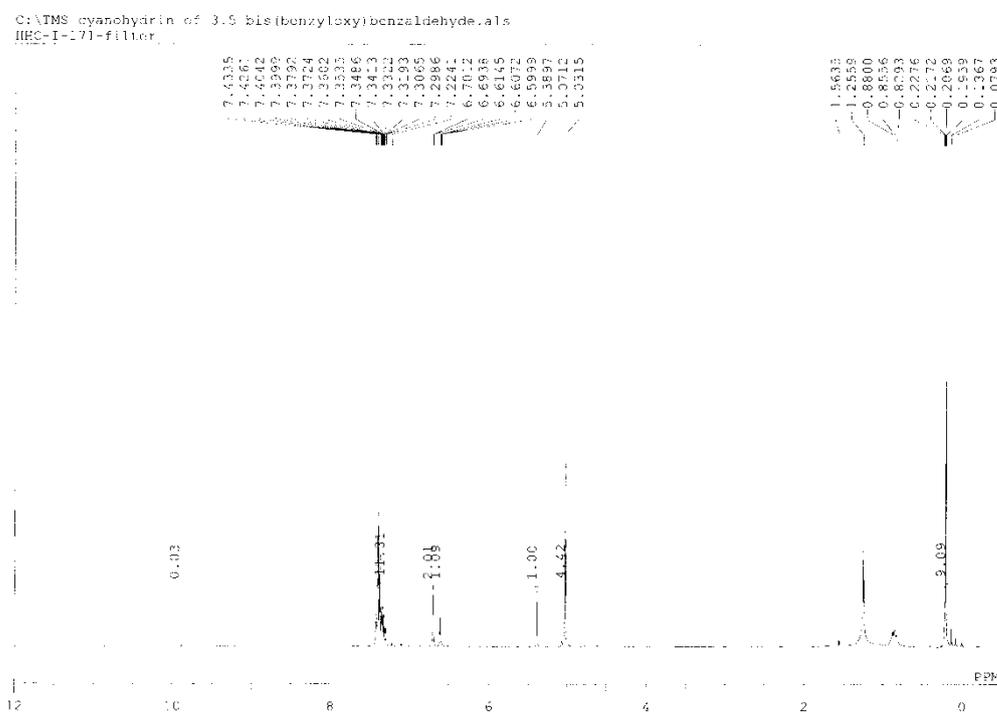
(c)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of 1-naphthaldehyde **3c** with catalyst **1**.



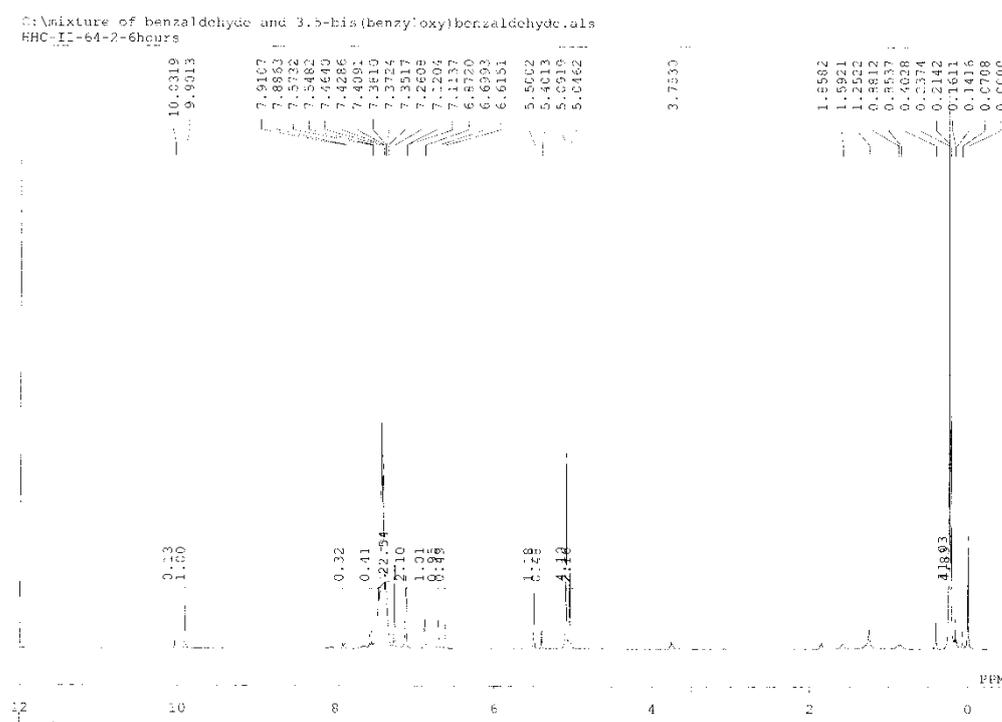
(d)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of 1-pyreneboxaldehyde **3d** with catalyst **1**.



(e)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of 9-anthraldehyde **3e** with catalyst **1**.

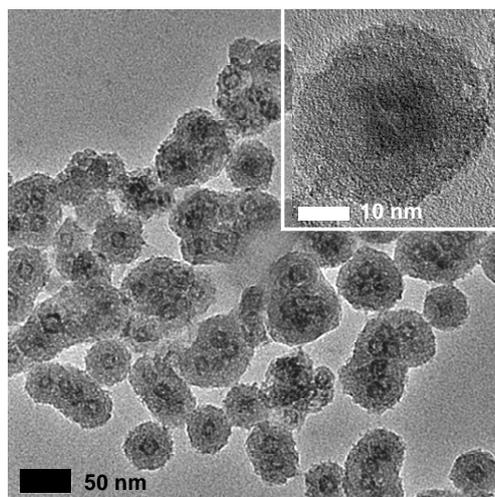


(f)  $^1\text{H}$  NMR spectrum of cyanosilylation reaction of 3,5-bis(benzyloxy)benzaldehyde **3f** with catalyst **1**.



(g) <sup>1</sup>H NMR spectrum of competitive cyanosilylation reaction of benzaldehyde **3a** and 3,5-bis(benzyloxy)benzaldehyde **3f** with catalyst **2d** after 6 hrs.

**Figure S2.** (a – g) Selected <sup>1</sup>H NMR spectra.



**Figure S3.** a) TEM images of the recovered **HMON@*h*-SiO<sub>2</sub>** catalysts after third run of the cyanosilylation reaction.