Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

[Supporting Information]

In situ growth synthesis of heterostructured $LnPO_4$-SiO_2 (Ln=La, Ce, and Eu) mesoporous materials as supports for small gold particles used in catalytic CO oxidation

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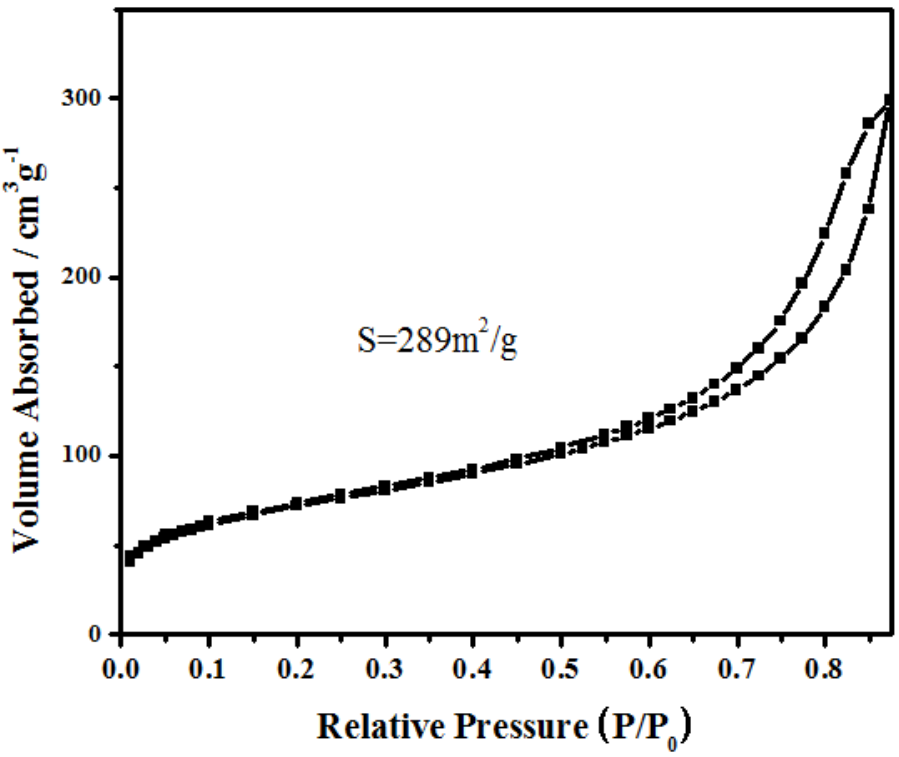

Figure S1. Nitrogen adsorption-desorption isotherms of Au-$LaPO_4$-MCFs.

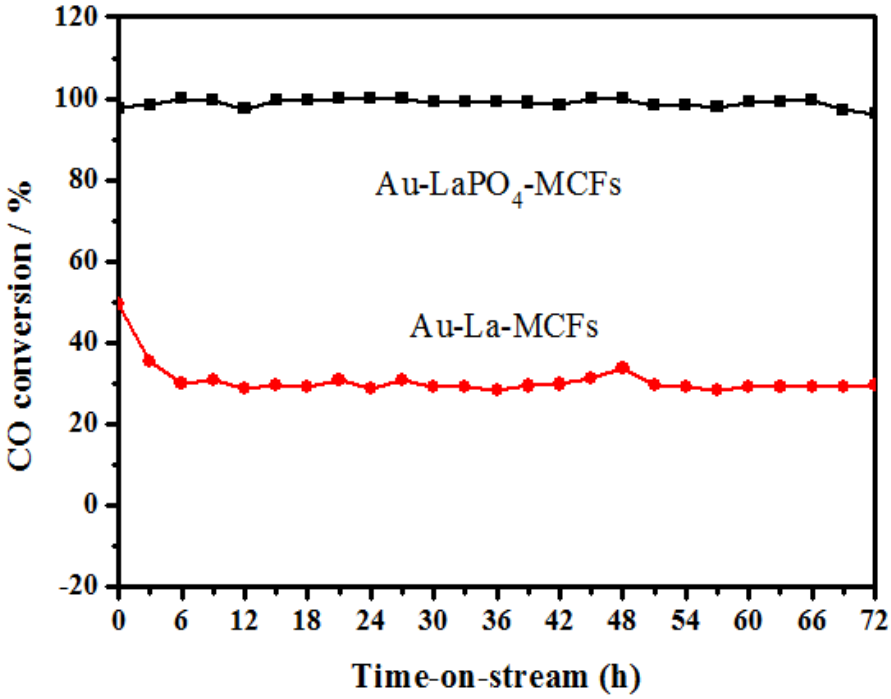

Figure S2. Time-on-stream of CO conversion over Au-$LaPO_4$-MCFs and Au-La-MCFs after 300 °C pretreatment. (SV=60000 mL/h/g_{cat})

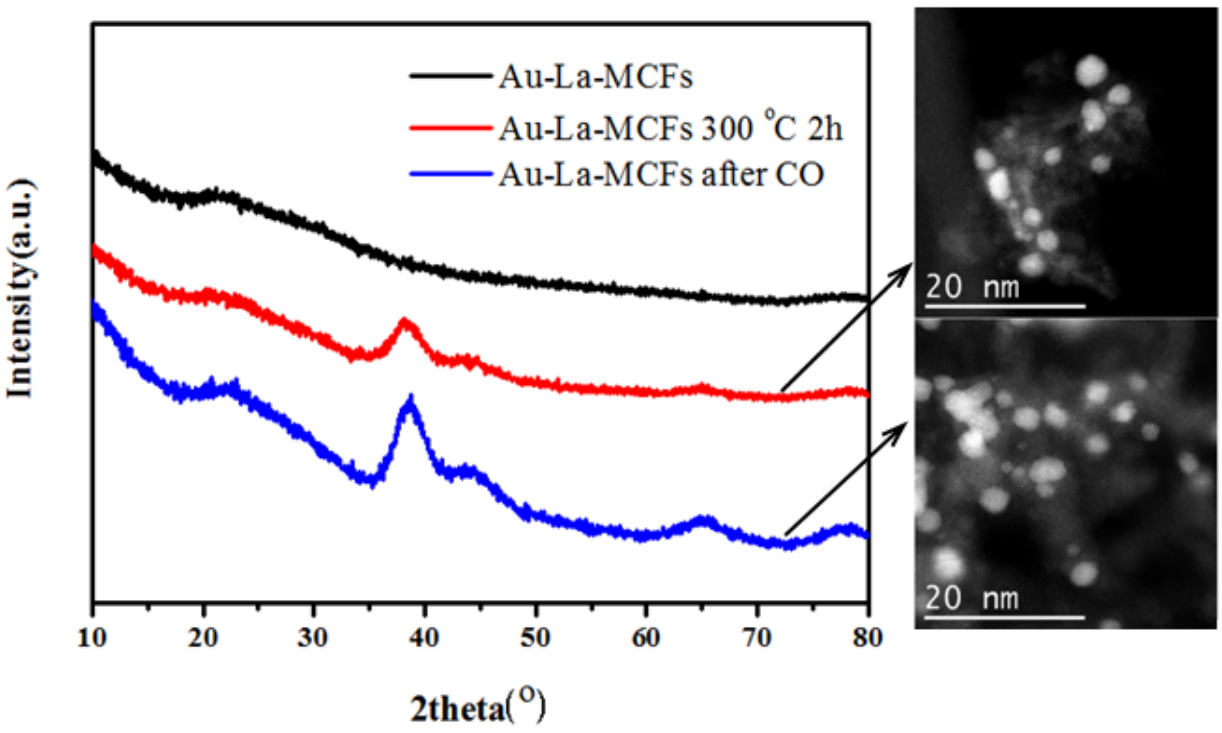

Figure S3. Wide-angle XRD patterns of Au-La-MCFs, Au-La-MCFs after calcination at 300°C, and 300°C-pretreated Au-La-MCFs after CO oxidation. And Z-contrast STEM of Au-La-MCFs after calcination at 300°C and 300°C-pretreated Au-La-MCFs after CO oxidation.

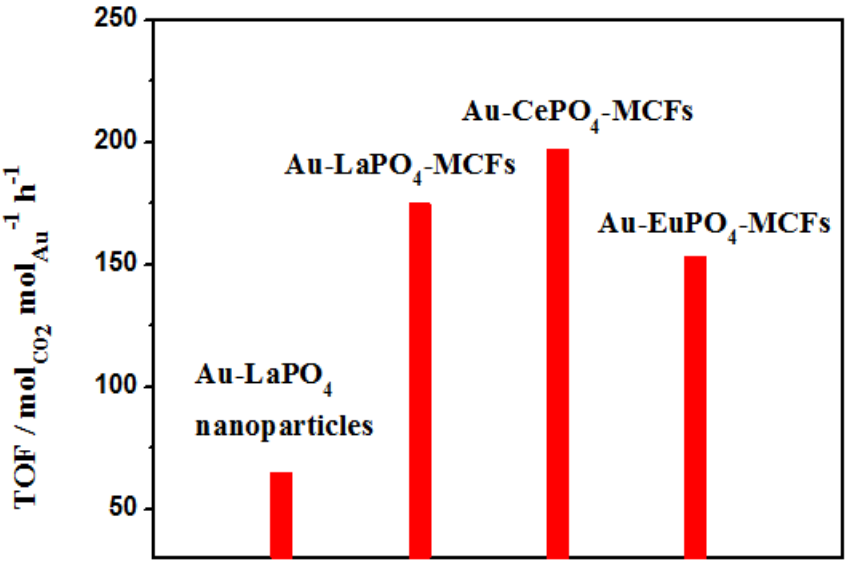

Figure S4. TOF values of Au-$LaPO_4$ nanoparticles, Au-$LaPO_4$-MCFs, Au-$CePO_4$-MCFs and Au-$EuPO_4$-MCFs

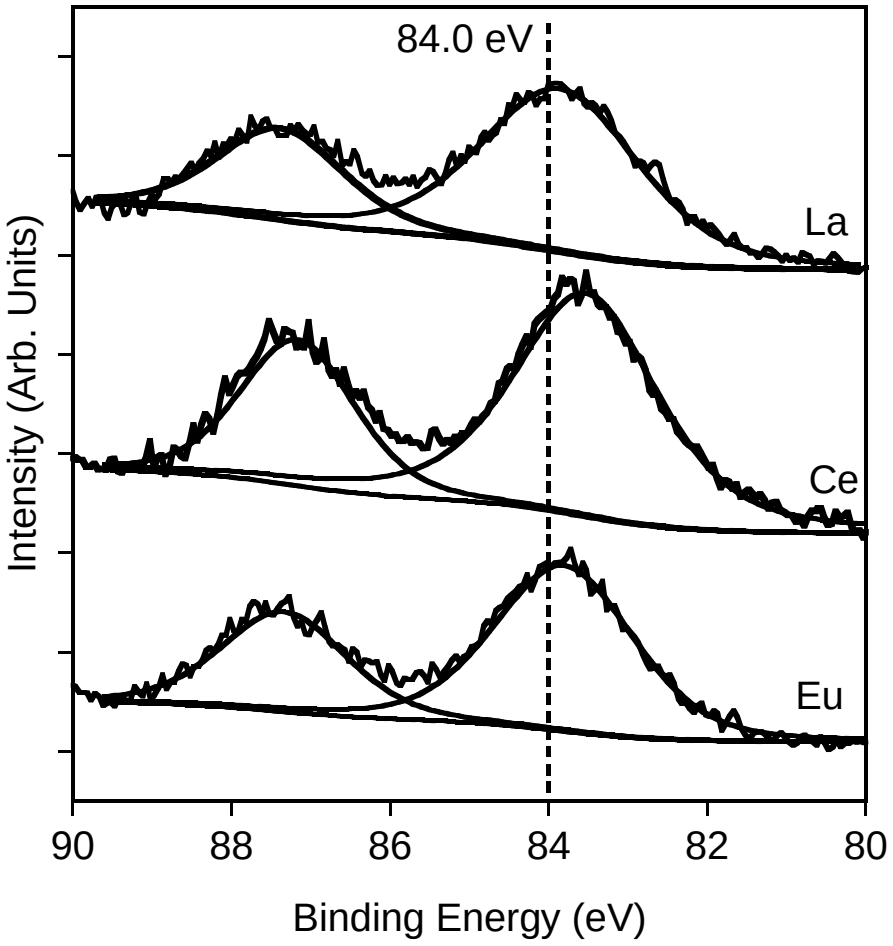

Figure S5. XPS spectra of Au-$LnPO_4$-MCFs samples.

XPS data collected for the Au-$LnPO_4$-MCF samples showed the formation of a single Au peak, located between 83.8 and 83.6 eV, which is consistent with the formation of Au^0 nanoparticles, Figure S5. The slight reduction in binding energy, compared to metallic gold foil (84.0 eV) is due to the well documented initial and final state effects that occur with a reduced metal coordination for the surface gold atoms on the small nanoparticles.[1,2] There was no indication of cationic gold in the samples due to the low content of cationic gold.

(1) M. G. Mason *Phys. Rev. B* 1983, **27**, 748.
(2) G. M. Veith; Lupini, A. R.; Dudney, N. J. *J. Phys. Chem. C* 2009, ***113***, 269.