Cerium-Copper Oxides Synthesized in a Multi-Inlet Vortex Reactor as Effective Nanocatalysts for CO and Ethene Oxidation Reactions

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Supporting information section

Table S1. EDX of the $CuCeO_x$ catalysts: the elemental content is expressed in percentage (wt.%) of each element in the catalysts.

Catalysts	Ce	O	Cu	Tot.
5%$CuCeO_x$	78	19	2	100
10%$CuCeO_x$	72	22	6	100
20%$CuCeO_x$	63	24	14	100
30%$CuCeO_x$	55	18	27	100
60%$CuCeO_x$	26	20	54	100

*The values are estimated over three different areas.

Table S2. Pearson correlation coefficients between some structural or chemical properties of the mixed oxides and their catlytic activity fo CO oxidation, in terms of specific reaction rates (reported in Table 6).

Parameter of Interest	Correlation Coefficient With the Reaction Rate of CO Oxidation
Relative abundance of O_α species	0.95
Relative abundance of Ce^{3+} species	0.80
Abundance of defect sites (D/F_{2g} ratio)	0.91

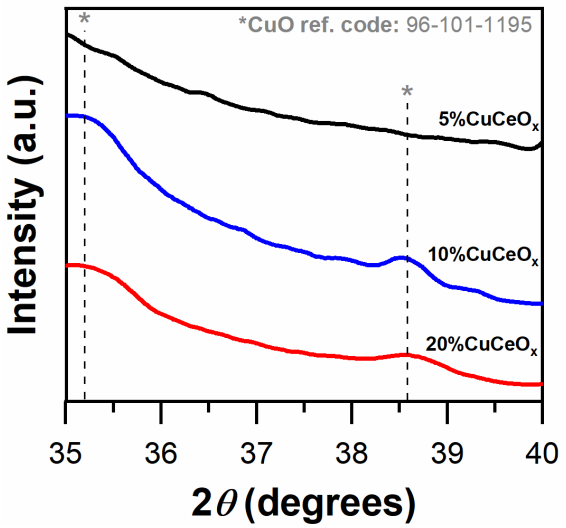

Figure S1. XRD magnification in the range 35–40° for the 5, 10 and 20 wt.% Cu samples. The typical peaks of CuO are marked with asterisks.

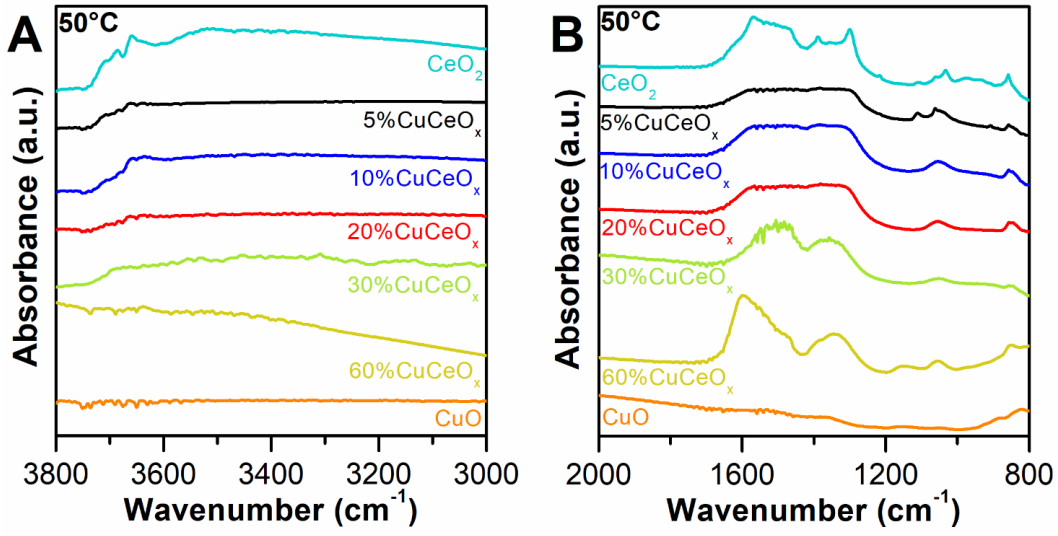

Figure S2. Normalized FT-IR spectra of the different catalysts outgassed at 50 °C in the (**A**) 3800–3000 cm^{-1} and (**B**) 2000–800 cm^{-1} range.

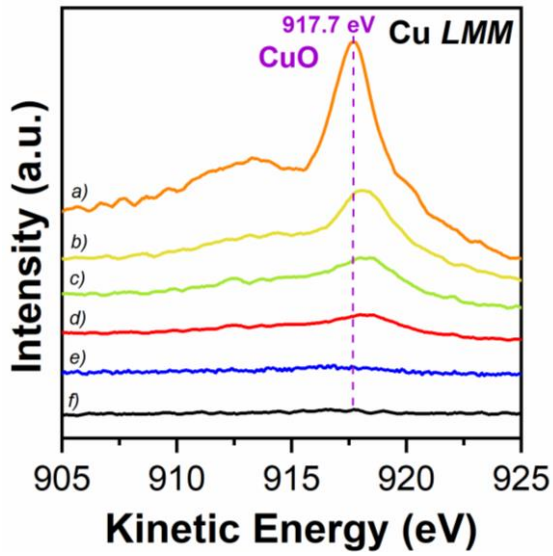

Figure S3. Cu LMM Auger spectra of a) CuO, b) 60%CuCeO$_x$, c) 30%CuCeO$_x$, d) 20%CuCeO$_x$, e) 10%CuCeO$_x$, f) 5%CuCeO$_x$.

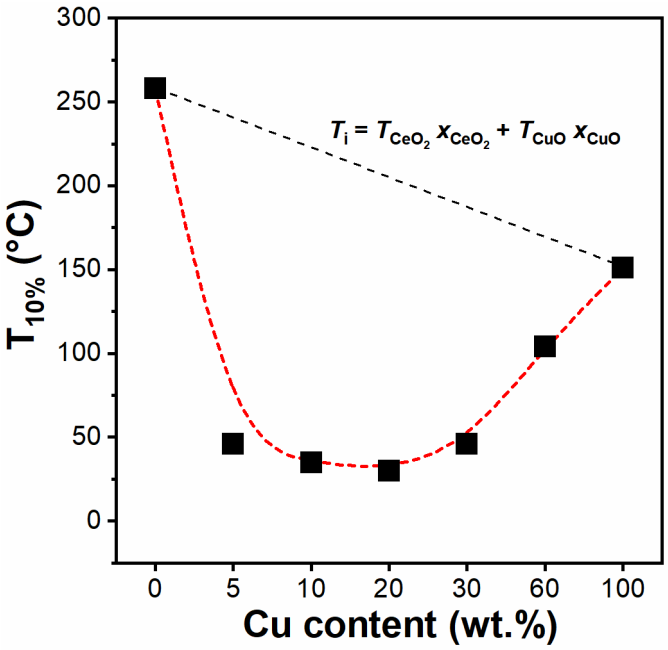

Figure S4. $T_{10\%}$ accomplished over the powder catalysts as a function of the Cu wt.% during the catalytic oxidation of CO.

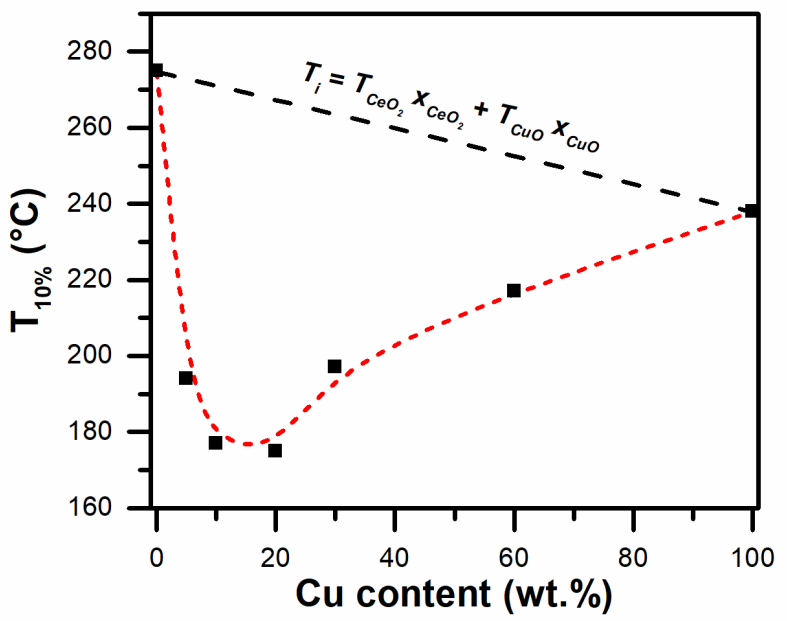

Figure S5. $T_{10\%}$ accomplished over the powder catalysts as a function of the Cu wt.% during the catalytic oxidation of ethene.

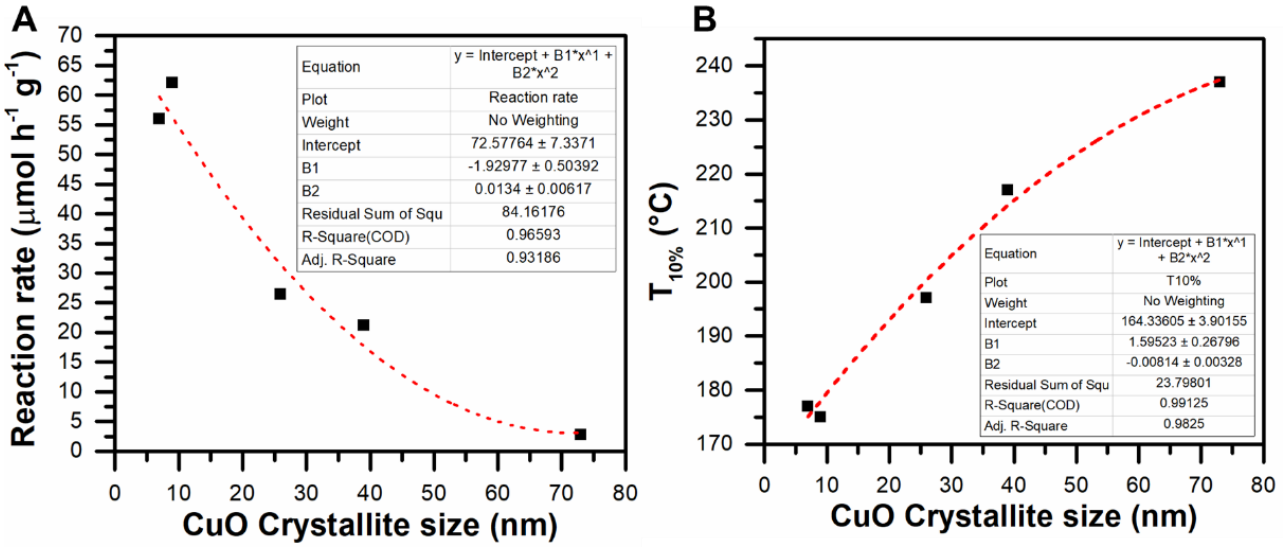

Figure S6. Catalytic activity trend observed during the ethene abatement tests with the ceria-based catalysts, in terms of A) ethene specific reaction rate and B) temperature for achieving 10% conversion of ethene.

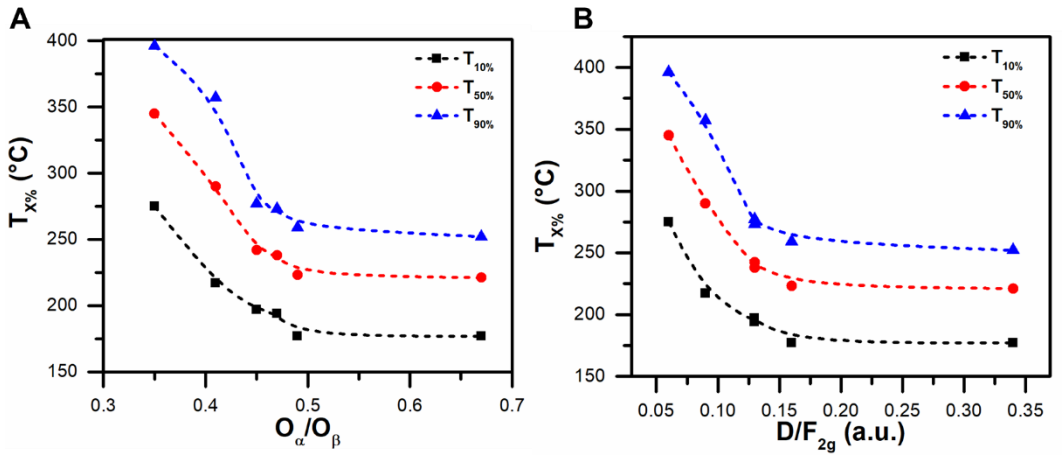

Figure S7. Catalytic activity performance trend (in terms of $T_{X\%}$) for the ethene oxidation reaction over the ceria-based catalysts, as a function of A) the O_α/O_β ratio and B) the amount of defect sites (D/F_{2g} ratio).