

Electronic Supplementary information

CO oxidation activity enhancement of $\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$ induced by Pd co-substitution

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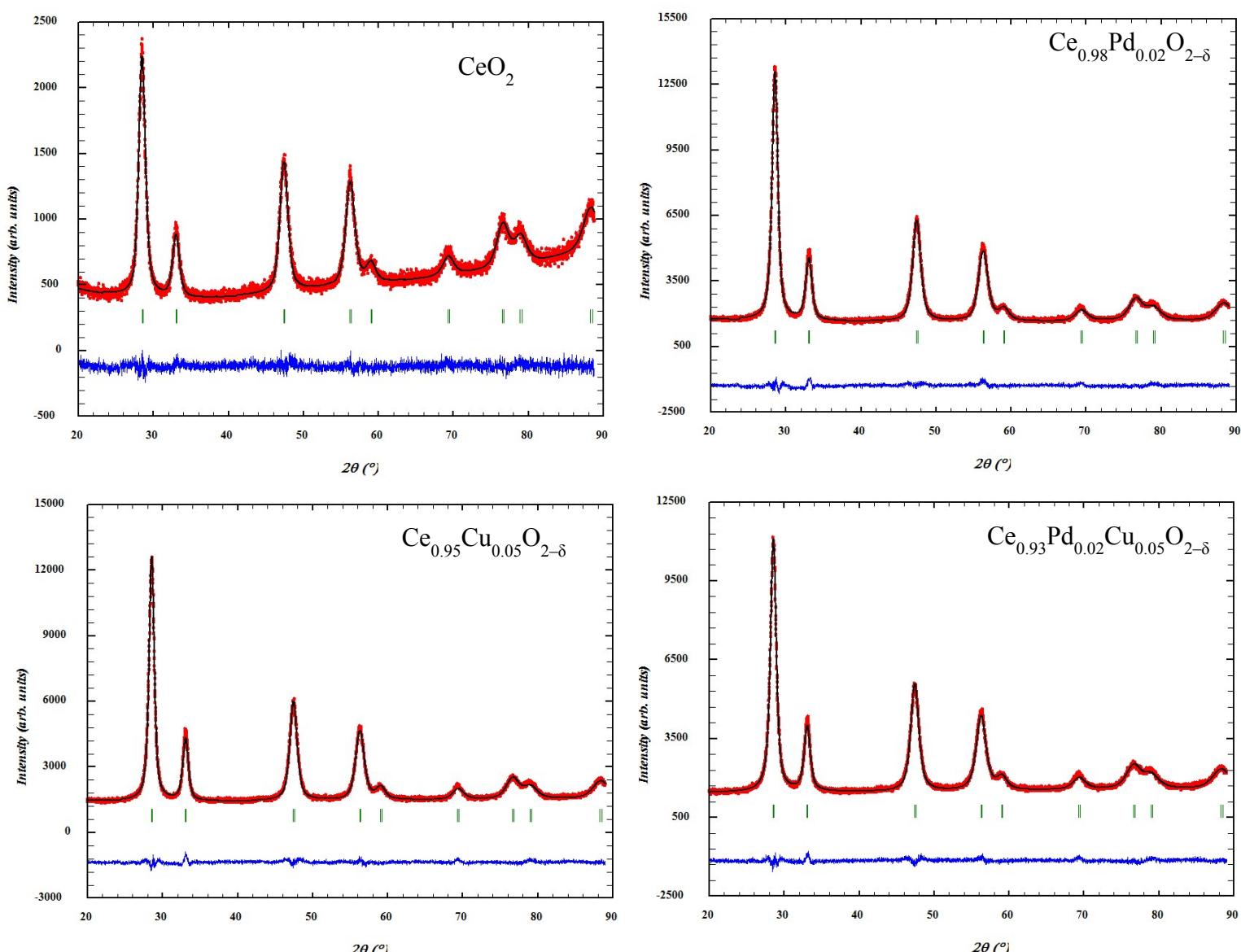


Fig. SI 1 Rietveld refined XRD patterns of CeO_2 , $\text{Ce}_{0.98}\text{Pd}_{0.02}\text{O}_{2-\delta}$, $\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$ and $\text{Ce}_{0.93}\text{Cu}_{0.05}\text{Pd}_{0.02}\text{O}_{2-\delta}$.

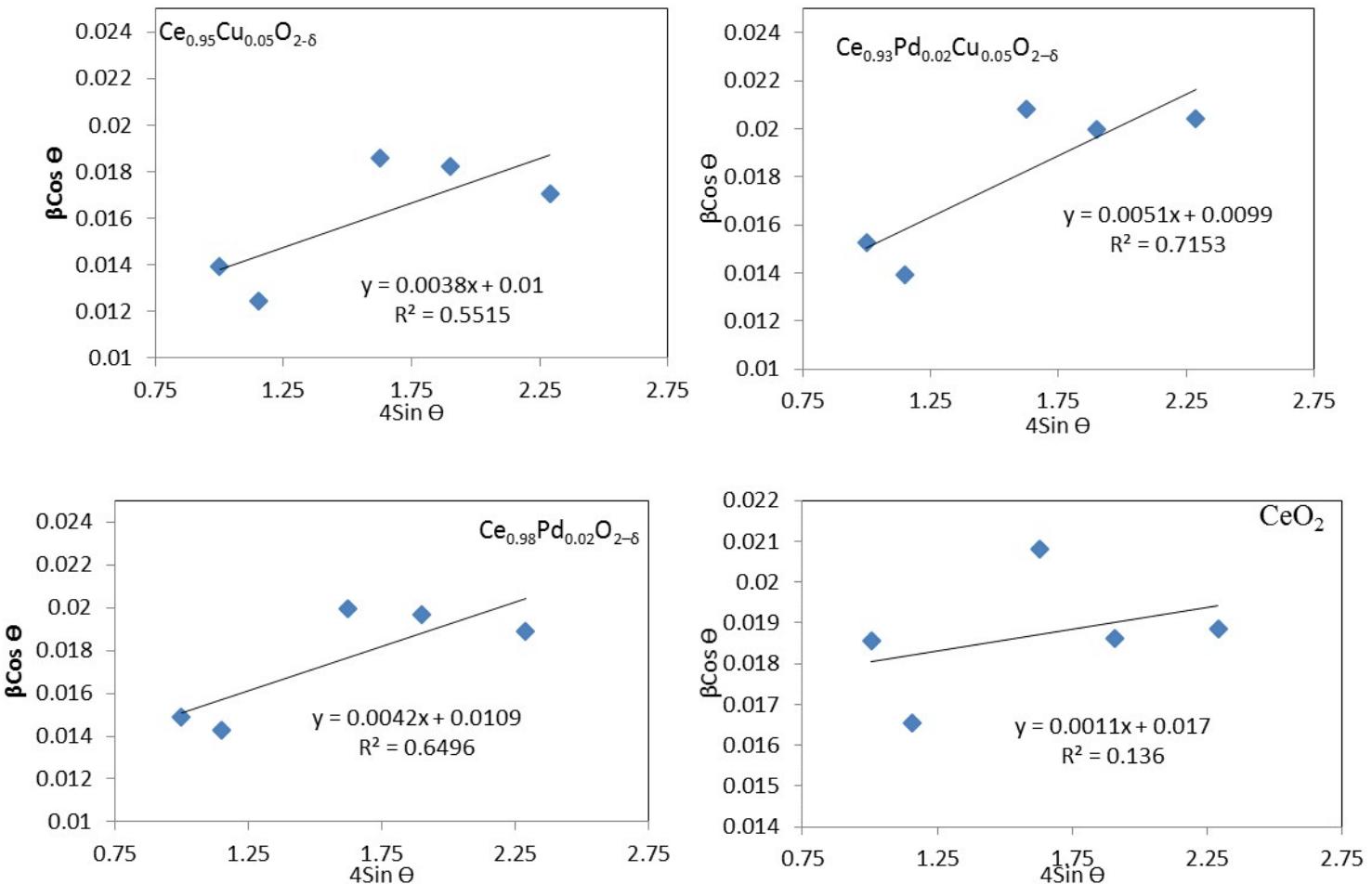


Fig. SI 2 Classical Williamson-Hall plot used to determine the lattice strain and crystallite sizes for CeO_2 , $\text{Ce}_{0.98}\text{Pd}_{0.02}\text{O}_{2-\delta}$, $\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$ and $\text{Ce}_{0.93}\text{Cu}_{0.05}\text{Pd}_{0.02}\text{O}_{2-\delta}$.

Table SI 1: Chemical composition and surface properties of prepared catalysts.

Catalyst	Ce (at%)	Pd (at%)	Cu (at%)	S_{BET} (m^2/g)	Average pore size (nm)	Pore volume (cm^3/g)
CeO_2	100	-	-	69	2.7	0.048
$\text{Ce}_{0.98}\text{Pd}_{0.02}\text{O}_{2-\delta}$	99.0	1.0	-	58	2.9	0.047
$\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$	94.8	-	5.2	51	3.2	0.041
$\text{Ce}_{0.93}\text{Cu}_{0.05}\text{Pd}_{0.02}\text{O}_{2-\delta}$	93.0	1.5	5.5	45	4.0	0.037

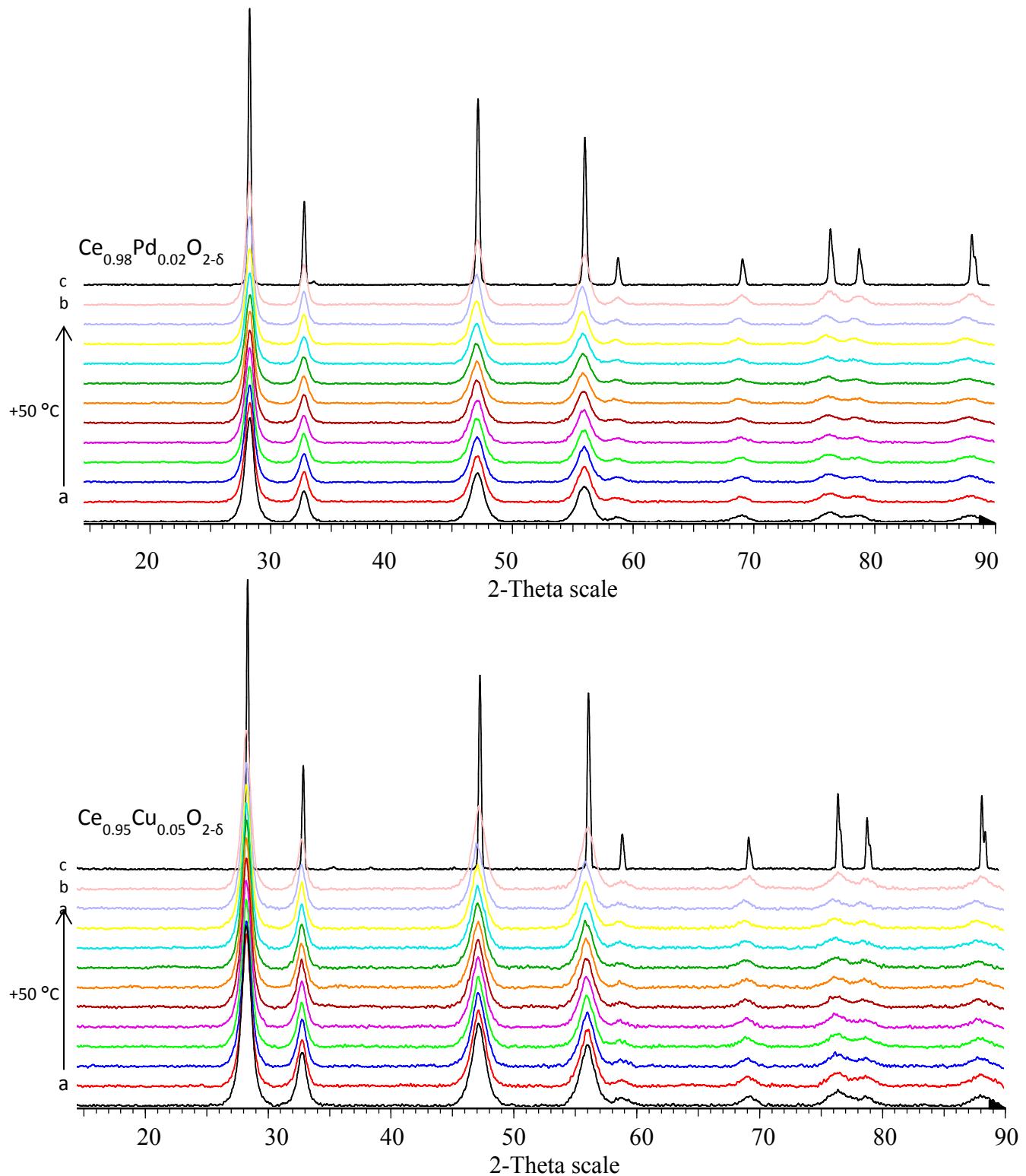


Fig. SI 3 In situ X-ray diffraction patterns of $\text{Ce}_{0.98}\text{Pd}_{0.02}\text{O}_{2-\delta}$ and $\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$ at temperature window between room temperature and (c) 1100 °C. (a) = 100 °C and (b) = 600 °C.

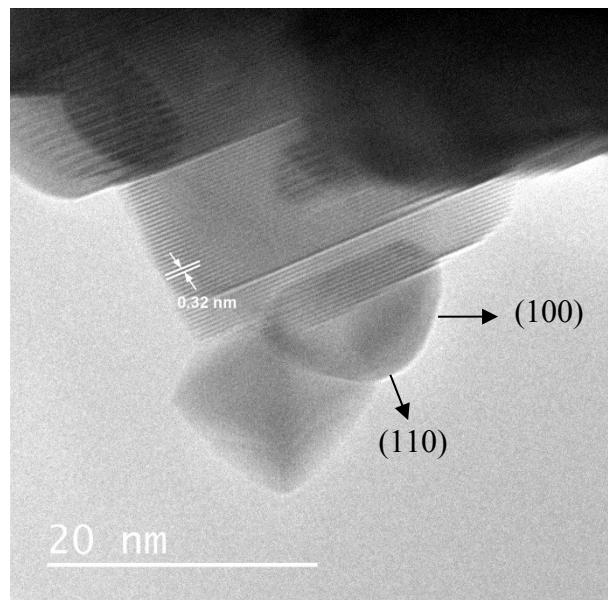


Fig. SI 4 HRTEM images of (a) $\text{Ce}_{0.93}\text{Cu}_{0.05}\text{Pd}_{0.02}\text{O}_{2-\delta}$

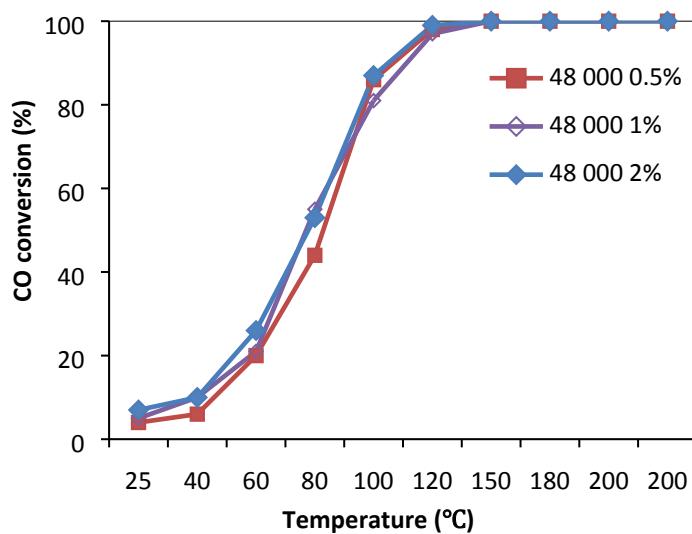


Fig. SI 5 CO conversion as a function of temperature at different CO:O₂ molar ratios over $\text{Ce}_{0.93}\text{Pd}_{0.02}\text{Cu}_{0.05}\text{O}_{2-\delta}$. GHSV = 48 000 h⁻¹

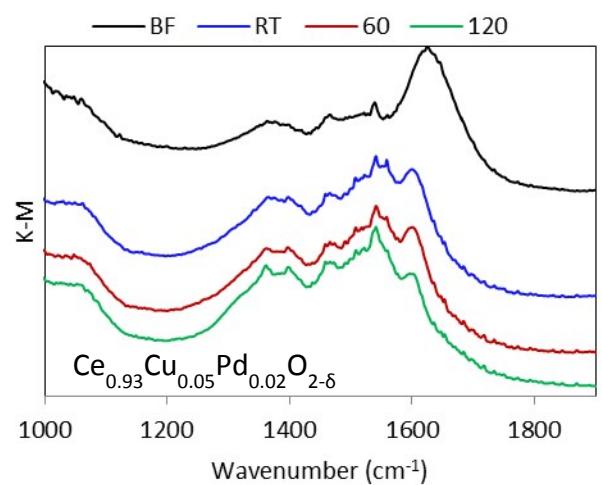
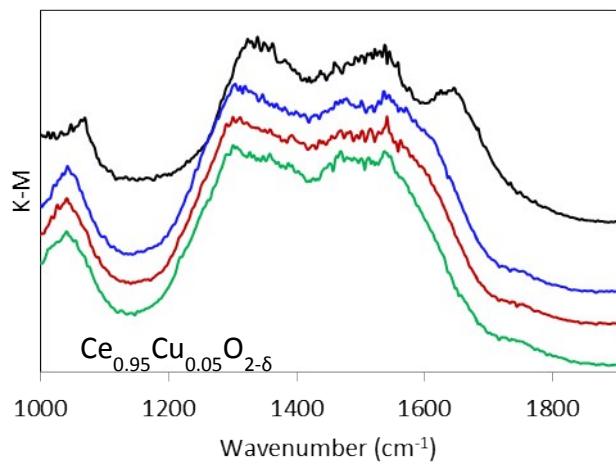
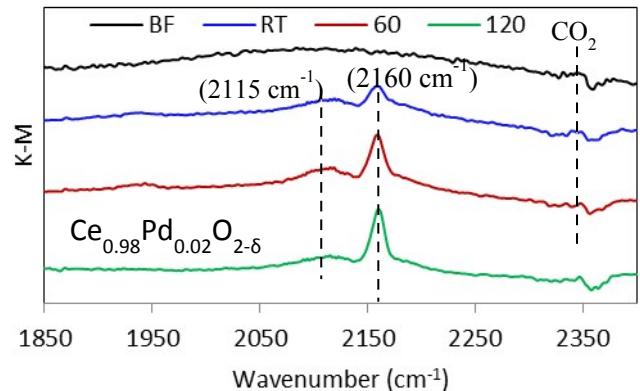
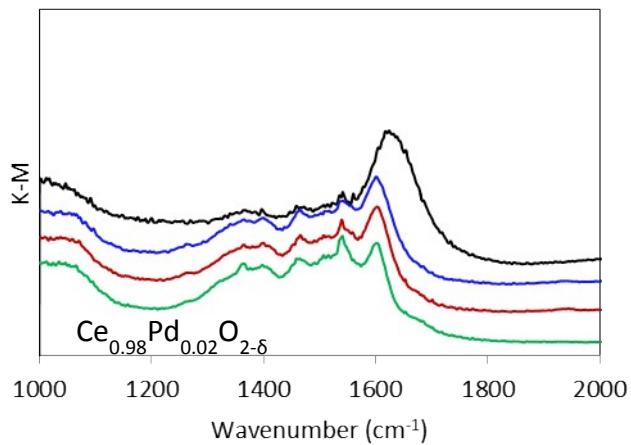


Fig. SI 6 DRIFT spectra of $\text{Ce}_{0.95}\text{Cu}_{0.05}\text{O}_{2-\delta}$, $\text{Ce}_{0.93}\text{Pd}_{0.02}\text{Cu}_{0.05}\text{O}_{2-\delta}$ and $\text{Ce}_{0.98}\text{Pd}_{0.02}\text{O}_{2-\delta}$. Spectra were recorded in the absence (BF) and presence of $\text{CO} + \text{O}_2$ at room temperature (RT), 60 °C and 120 °C.