ELECTRONIC SUPPLEMENTARY INFORMATION

Structure-reactivity relationship in Co_3O_4 promoted Au/CeO_2 catalysts for the CH_3OH oxidation reaction revealed by in situ FTIR and operando EXAFS studies

M. Manzoli[a]*, F. Vindigni[b], T. Tabakova[c], C. Lamberti[b,f], D. Dimitrov[d], K. Ivanov[d], G. Agostini[e,g]

[a] *Department of Drug Science and Technology and NIS Interdepartmental Centre, University of Torino, 10125 Torino, Italy.*

[b] *Department of Chemistry and NIS Interdepartmental Centre, University of Torino, 10125 Torino, Italy.*

[c] *Institute of Catalysis, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria*

[d] *Department of Chemistry, Agricultural University, 4000 Plovdiv, Bulgaria*

[e] *Leibniz Institute for Catalysis at the University of Rostock, Albert-Einstein-Str. 29a, D-18059 Rostock, Germany*

[f] *IRC "Smart Materials", Southern Federal University, Zorge Street 5, 344090 Rostov-on-Don, Russia.*

[g] *European Synchrotron Radiation Facility, 38043 Grenoble, France*

mail to: * maela.manzoli@unito.it

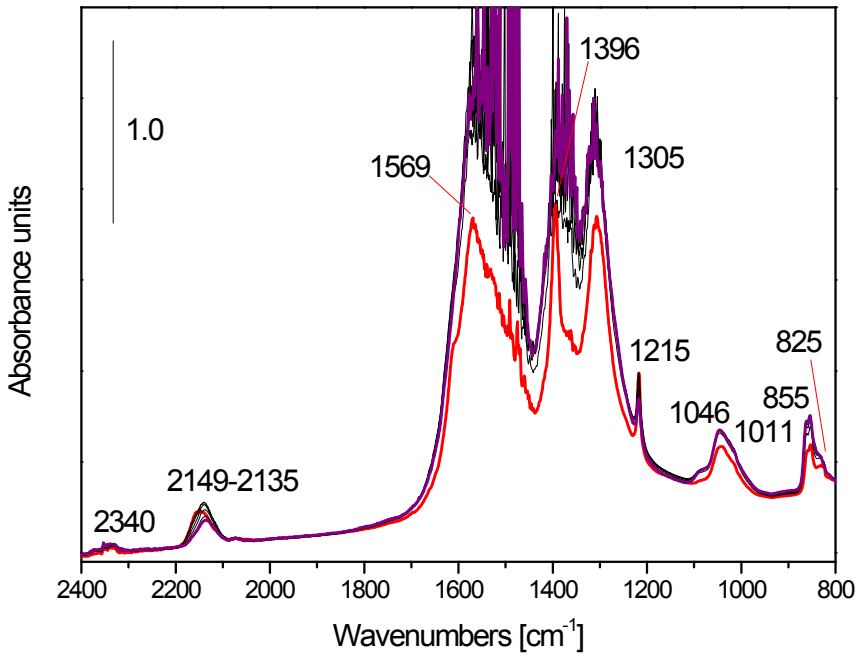

Figure S1. FTIR difference spectra collected upon CO inlet (15 mbar) at r.t. and subsequent pressure decreases down to 1.0 x 10^{-3} mbar on AuCe10Co before methanol oxidation reaction.

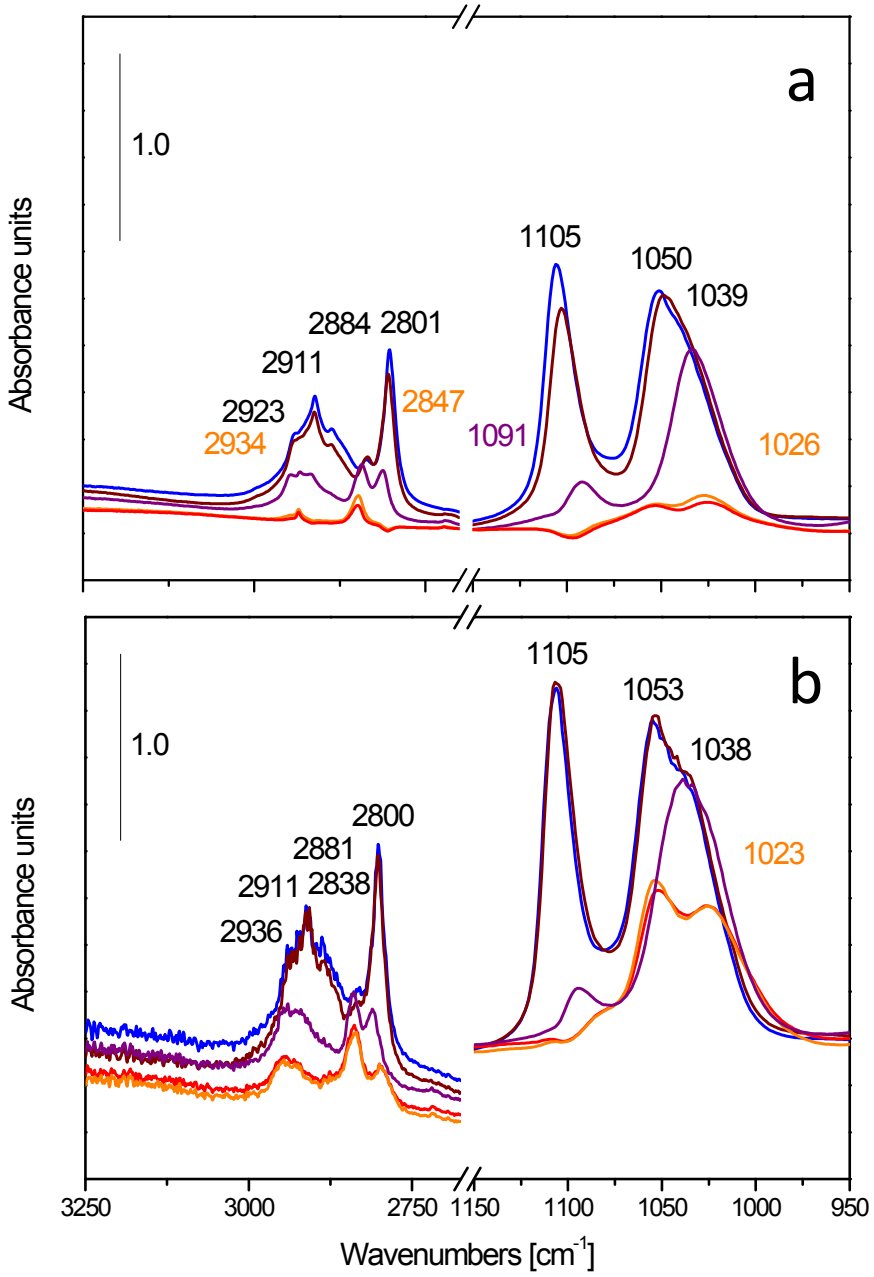

Figure S2. FTIR difference spectra collected on AuCe (section a) and AuCe10Co (section b) upon the adsorption of 5 mbar CH_3OH at r.t. (blue lines) and at increasing temperature after the inlet of 5 mbar O_2 on preadsorbed methanol: 50 °C (brown lines), 75 °C (violet lines), after 10 min (orange lines) and 20 min (red lines) at 100 °C.

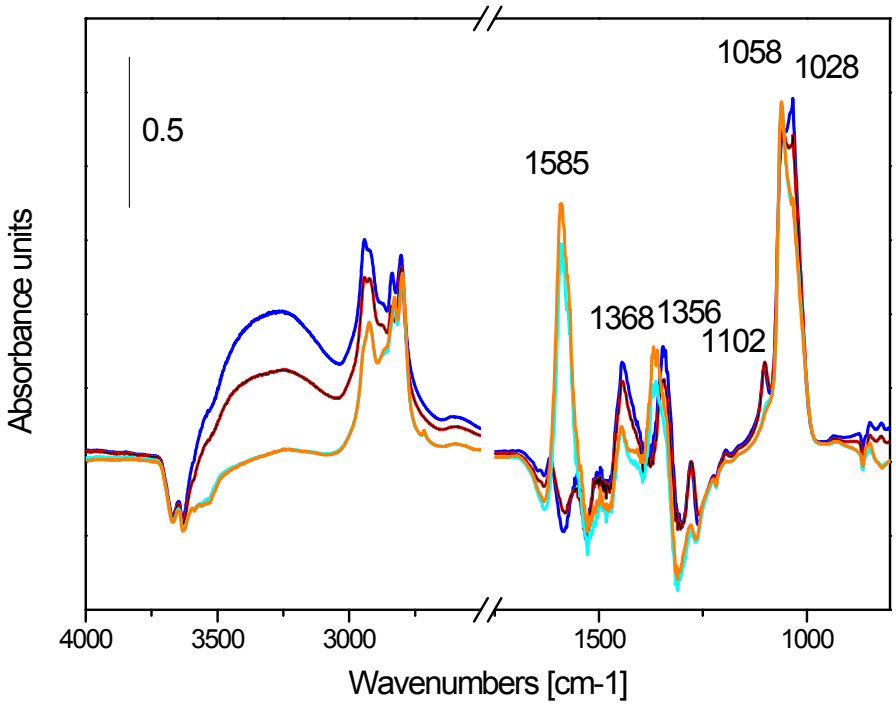

Figure S3. FTIR difference spectra collected on AuCe in contact with 5 mbar methanol after 10 min at r.t. (blue line), at 50 °C (red line), at 75 °C (black line), at 100 °C (cyan line) and after 20 min at the same temperature (orange line).

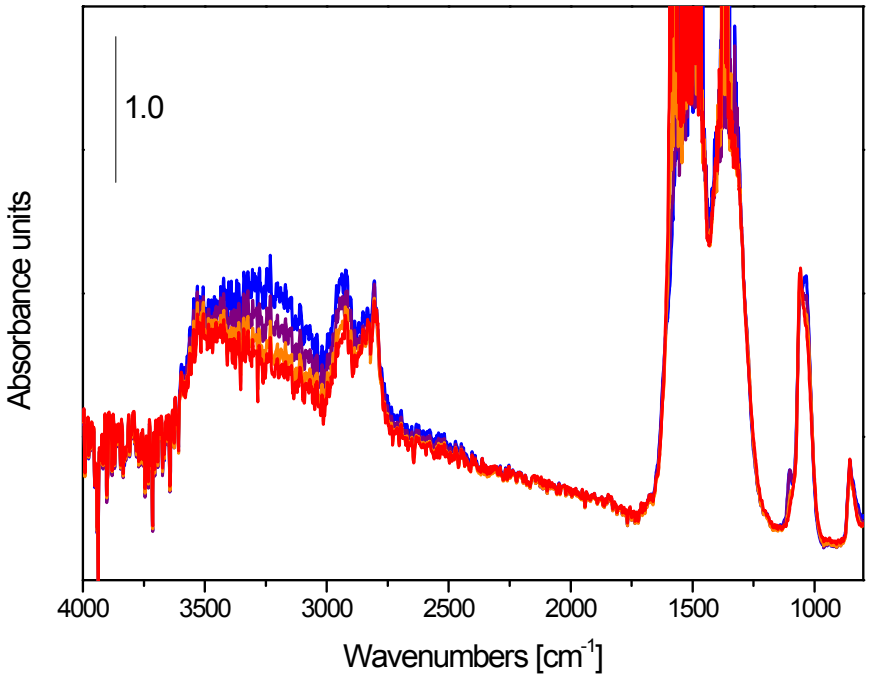

Figure S4. FTIR difference spectra collected on AuCe10Co in contact with 5 mbar methanol after 10 min at r.t. (blue line), at 50 °C (violet line), at 75 °C (orange line) and at 100 °C (red line).

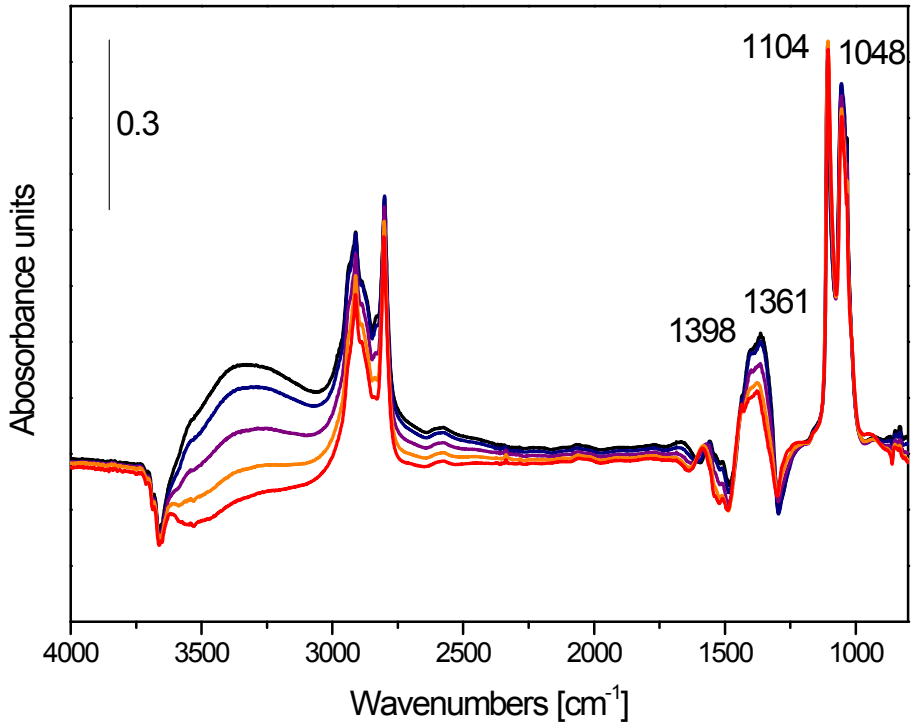

Figure S5. FTIR difference spectra collected on Ce10Co with the methanol/oxygen mixture after 10 min at r.t (black curve), at 50 °C (blue curve), at 75 °C (orange curve), and at 100 °C (red curve).

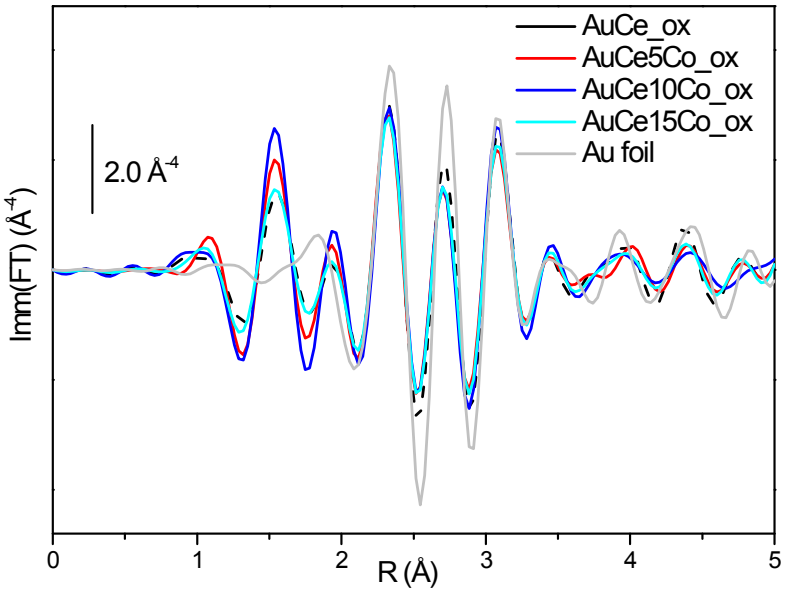

Figure S6: Immaginary part of k^3-weighted, phase uncorrected, FT of the Au L_3-edge EXAFS spectra of the catalysts prepared on differently Co doped ceria substrate and submitted to thermal treatment in oxygen at 400°C. Same data reported in Figure 5a.