Reduction of Ceria after 1 Hour of CO Exposure

Date: 2022-11-30
Tags: CeO2 DRIFTS CO room temperature
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Goal :

To understand the extent of reduction over a period of 1 hour and compare it to 2 hours of CO exposure.

Procedure :

Run a background in an O_2 atmosphere preheating with a resolution of 2 cm^{-1} LC0011.0
Heating in O_2 for 1 hour 1000 °C

Initial sample is lost - Try again (Blown by gas)
Run second preheating background also in an O_2 atmosphere with a resolution of 2 cm^{-1} LC0011.1

Heat for 78 minutes in O_2, at 1000 °C

Cool the sample down to room temperature

T<30 °C in O2 batch, change over time - LC0011.0000-0001

Go to bypass and run CO through bypass during cool down phase (~ 30-60 min) start 13:55 - 14:32 (37)
When at room temperature switch CO to sample from the bypass (26 °C) - LC0011.0002-0012

Run the experiment for 1 hour at 100 °C (ref to 13 change during heating) - LC0011.0013-0047

Heater turned off 15:56
LC0011.0048-0059 - cool down, measure at rt, probably hydroxylation (ref to 48, look to cool down)

(start 24 °C) (ref to 12 ... before after heating - LC0011.0060-0074

no real change anymore
flush with O_2, change setup, heat to 200 °C, change to CO, with LN2 trap,

Sample lost, try again

LC0011.0079-0081 - mit LN2 trap, 200 °C
switch to CO
LC0011.0082-0084 - at 200 °C
cool down in CO, with LN2 trap

Results :

No conclusive signs of reduction, the sample may not have been properly cleaned, LN_2 trap is tested to see if it can reduce the water content. Water leads to poor adsorption.

(Data saved - DRIFTS PC; Folder – Data --> L Caulfield; File name - 20221130_CeO2_60_red)

Unique eLabID: 20230703-ed192011c4baf9fc1eae3d19049a0e063f80b991
Link: https://ifgselabftw.ifg.kit.edu/experiments.php?mode=view&id=2258