

# Ceria Cleaned in O<sub>2</sub> and Exposed to CO at High Pressure (Batch)

**Date:** 2023-02-17

**Tags:** DRIFTS CO high pressure CeO<sub>2</sub> powder High temperature

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## Goal :

To see the effect of increasing pressure from low pressures to higher pressure on the CO adsorption bands

## Procedure :

Preheat CeO<sub>2</sub> in atmosphere 225 °C overnight

Initial background run in Ar LC0042.0

Second background run in O<sub>2</sub> LC0042.1

LC0042.0000-0002 in O<sub>2</sub> before heating

Heat sample to 750 °C

Sample started heating at 10:03

LC0042.0003-0007 - after heating 23 °C

close all valved, let CO run through bypass

realign sample, loss of I (1300 to 3300)

LC0042.0008-0012

new BG LC0042.2

open CO (not outlet) with different pressures

0.2 bar

LC0042.0013-0138 (start with CO 38)

0.5 bar (open valves, close out, start when 100 ml/min left)

LC0042.0139-0238

1.0 bar (start 20 ml/min left)

LC0042.0239-0338

\_\_\_\_\_ ignore below \_\_\_\_\_

2.0 bar (open valves, close out, start when 100 ml/min left)

LC0042.0339-0350 -> limit of CO detection

1.5 bar (open valves, close out, start when 100 ml/min left)  
LC0042.0351-0450

1.0 bar (open valves, close out, start when 100 ml/min left)  
LC0042.0451-0550

0.5 bar (open valves, close out, start when 100 ml/min left)  
LC0042.0551-650

0.2 bar (open valves, close out, start when 100 ml/min left)  
LC0042.0651-750

Allow to run in batch at 128 scans, 0.2 bar CO  
LC0042.0751-0826

\_\_\_\_\_ test 8 scans, flush with Ar, 0.1 bar CO

LC0042.0827-0866, 0.1 bar, no CO ads

try to get a ref?

LC0042.0867-0876, 1 bar

LC0042.0877-0881, 0.2 bar

desorption CO 100 °C, 2 minutes, does the bands split again??

LC0042.0882-0992, cool down 30 °C end

## Results :

Bands do not seem to be affected by the pressure change, the rate of band merging occurs more rapidly at higher pressures, however a good reference is needed to remove the gas phase signal for a conclusive evaluation.

Note: 2 bar will over saturate the detector when using pure CO, use up to 1.5 bar only, this is the absolute limit.

**(Data saved - DRIFTS PC; Folder - Data --> L Caulfield; File name - 20230217\_CeO2\_HighT\_O2\_pressure\_2bar\_batch)**



Unique eLabID: 20230704-485e166a8a84bbf50f159bea5328d9d4dec4b6  
Link: <https://ifgselabftw.ifg.kit.edu/experiments.php?mode=view&id=2271>