**Supplementary information**

**Ordered *versus* non-ordered mesoporous CeO2-based systems for the direct synthesis of dimethyl carbonate from CO2**

Nicoletta Rusta1,2 #, Fausto Secci1,2 #, Valentina Mameli1,2, Carla Cannas1,2 \*

1 Department of Chemical and Geological Sciences, University of Cagliari, S.S. 554 bivio per Sestu, 09042 Monserrato (CA), Italy

2 Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (INSTM), Via Giuseppe Giusti 9, 50121 Firenze (FI), Italy

# Equal contribution

\* Corresponding author: ccannas@unica.it



Figure S1 Rietveld refinement of CeO2\_Meso.



Figure S2 Rietveld refinement of CeO2@SBA-15\_TS.



Figure S3 Rietveld refinement of CeO2@SBA-15\_SC.

Table S1 EDX quantitative analysis for CeO2@SBA15\_TS.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Spot** | **Element** | **Wt%** | **Wt% Sigma** | **Atomic %** |
| Spot 1 | Ce | 7.75 | 0.52 | 1.13 |
| Si | 33.82 | 0.45 | 24.51 |
| O | 58.43 | 0.54 | 74.36 |
| Spot 2 | Ce | 9.18 | 0.22 | 1.42 |
| Si | 41.41 | 0.24 | 31.86 |
| O | 49.41 | 0.26 | 66.73 |
| Spot 3 | Ce | 8.71 | 0.23 | 1.33 |
| Si | 40.99 | 0.26 | 31.28 |
| O | 50.30 | 0.28 | 67.39 |
| Spot 4 | Ce | 8.79 | 0.23 | 1.35 |
| Si | 42.09 | 0.26 | 32.35 |
| O | 49.12 | 0.28 | 66.29 |
| Spot 5 | Ce | 9.89 | 0.31 | 1.55 |
| Si | 42.43 | 0.33 | 33.12 |
| O | 47.68 | 0.36 | 65.34 |

Table S2 EDX quantitative analysis for CeO2@SBA15\_SC.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Spot** | **Element** | **Wt%** | **Wt% Sigma** | **Atomic %** |
| Spot 1 | Ce | 3.49 | 0.06 | 0.55 |
| Si | 56.45 | 0.09 | 44.28 |
| O | 40.06 | 0.09 | 55.17 |
| Spot 2 | Ce | 2.56 | 0.12 | 0.38 |
| Si | 48.04 | 0.18 | 35.52 |
| O | 49.39 | 0.18 | 64.10 |
| Spot 3 | Ce | 7.01 | 0.43 | 0.99 |
| Si | 30.79 | 0.42 | 21.78 |
| O | 62.20 | 0.50 | 77.23 |
| Spot 4 | Ce | 12.78 | 0.30 | 1.98 |
| Si | 35.06 | 0.28 | 27.14 |
| O | 52.16 | 0.32 | 70.88 |
| Spot 5 | Ce | 15.95 | 0.09 | 2.61 |
| Si | 37.32 | 0.09 | 30.45 |
| O | 46.73 | 0.10 | 66.94 |
| Spot 6 | Ce | 3.13 | 0.34 | 0.43 |
| Si | 31.99 | 0.30 | 21.83 |
| O | 64.88 | 0.37 | 77.74 |
| Spot 7 | Ce | 5.27 | 0.21 | 0.78 |
| Si | 41.62 | 0.30 | 30.62 |
| O | 53.11 | 0.31 | 68.60 |
| Spot 8 | Ce | 6.34 | 0.26 | 0.95 |
| Si | 42.99 | 0.33 | 32.27 |
| O | 50.68 | 0.35 | 66.78 |
| Spot 9 | Ce | 14.58 | 0.24 | 2.36 |
| Si | 38.13 | 0.24 | 30.73 |
| O | 47.29 | 0.27 | 66.91 |
| Spot 10 | Ce | 15.87 | 0.25 | 2.64 |
| Si | 40.31 | 0.24 | 33.47 |
| O | 43.82 | 0.27 | 63.89 |
| Spot 11 | Ce | 7.57 | 0.20 | 1.14 |
| Si | 40.44 | 0.25 | 30.36 |
| O | 51.99 | 0.27 | 68.50 |
| Spot 12 | Ce | 14.15 | 0.19 | 2.29 |
| Si | 39.17 | 0.19 | 31.60 |
| O | 46.68 | 0.21 | 66.11 |
| Spot 13 | Ce | 11.27 | 0.20 | 1.74 |
| Si | 37.46 | 0.21 | 28.88 |
| O | 51.27 | 0.24 | 69.38 |