catalysts

MDPI

Supplementary Materials

Study of the direct CO_2 carboxylation reaction on supported metal nanoparticles

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1. Characterization techniques

X-ray diffraction (XRD) patterns were collected from 10 to 70° 2t (0.014° step size with a step time of 0.1 s per point) using a Bruker D8 Advance diffractometer equipped a 1D Lynx eyes detector and a Cu Kα1 radiation source (λ = 1.5406 Å) operating at 40 kV and 40 mA. Crystalline phases were identified by comparison with the reference data from ICDD (International Centre for Diffraction Data) files.

The elemental analysis was performed by inductively coupled plasma-optic emission spectroscopy 720-ES ICP-OES (Agilent) with axially viewing and simultaneous CCD detection. The quantitative determination of metal content in the catalysts was made based on the analysis of certificated standard solution. The ICP ExpertTM software (version 2.0.4) provides the concentration of metal in sample allowing estimating the weight percentage of Ag. The operating parameters of the instrument were continuously monitored to ensure the maximum performance and reliability of the ICP-OES results. All the analyses were performed 40 min after the spectrometer was turned on to achieve a stable plasma as well as constant and reproducible sample introduction.

Table S1. Results of the ICP-OES analysis of Ag/SiO_2 catalyst.

Mean (3 analysis) Ag wt%	Standard deviation %	Relative standard deviation%
5.58%	0.07%	1.21%

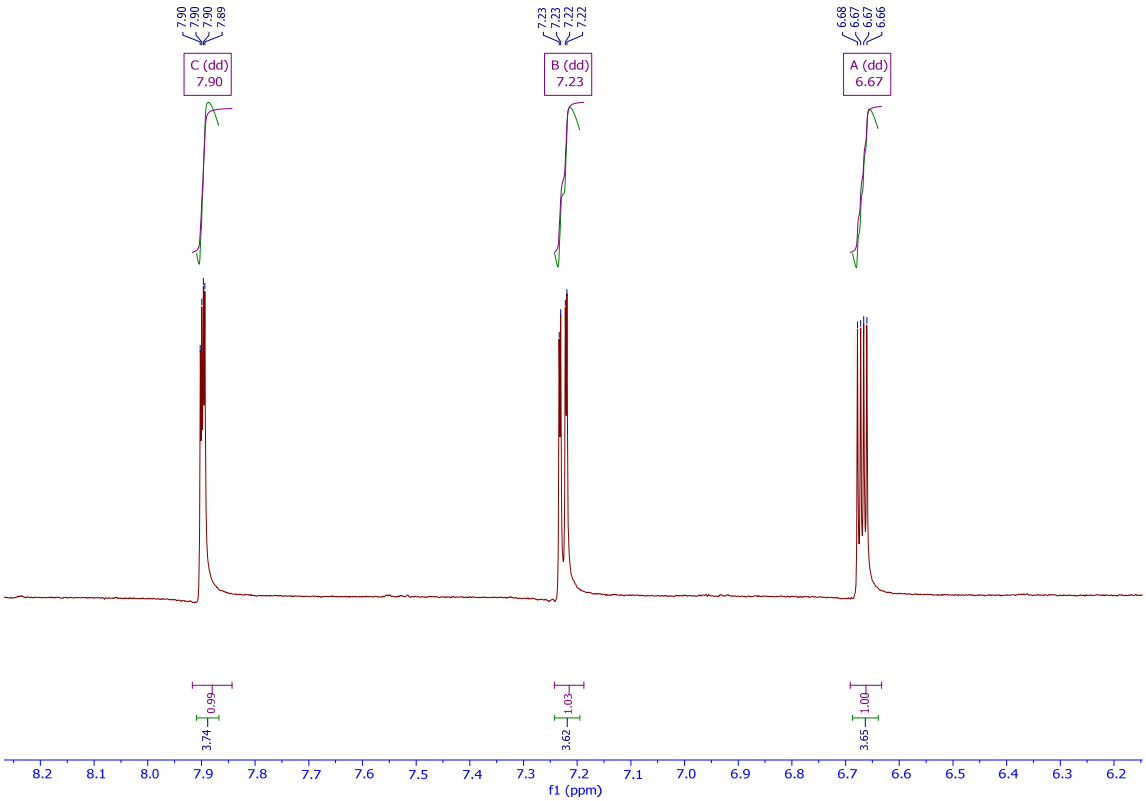

Figure S1. ^{1}H-NMR spectrum of furoic acid in DMSO-d_6.

FA spectrum presents 3 peaks at 6.7, 7.2 and 7.9 ppm.

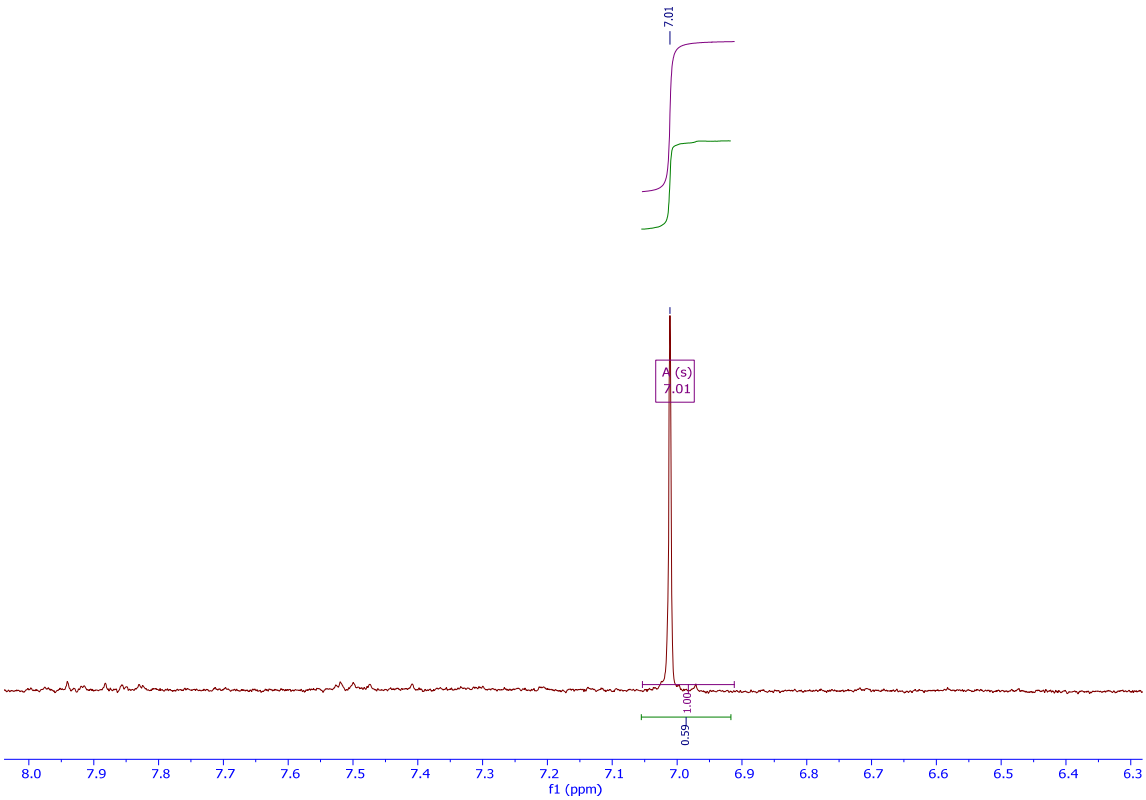

Figure S2. ^{1}H-NMR spectrum of 2,5-FDCA in DMSO-d_6.

2,5-FDCA spectrum presents 1 peak at 7.0 ppm.

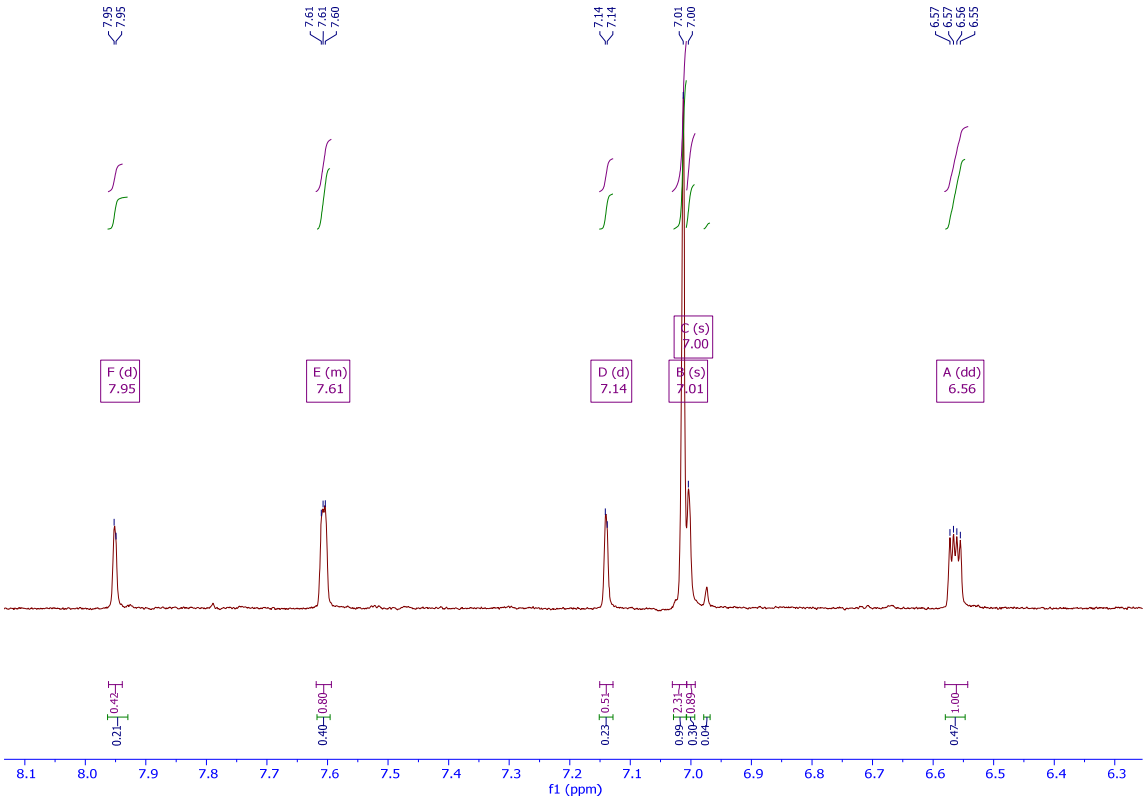

Figure S3. [1]H-NMR spectrum of the crude products obtained from the carboxylation of K2F to FDCA in DMSO-d6.

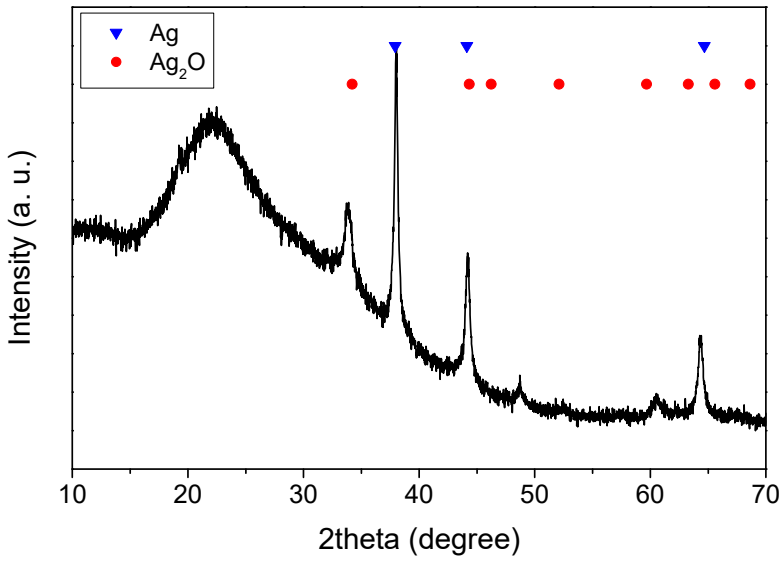

Figure S4. XRD diffractogram of Ag/SiO_2 freshly prepared.