
Poster

ZIF-8 deposited onto TiO₂ microcolumns as effective catalyst for CO₂ reduction.



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ABSTRACT

Motivation: Global warming is one of the biggest issues that society is currently facing. CO₂ is one of the most important gases of greenhouse gases due to anthropogenic emissions from industrial activities, transport, energy sector, agriculture, livestock, etc. An environmentally friendly alternative to reduce the amount of CO₂ is the use of Metal-Organic Frameworks (MOFs), in particular, a subfamily of MOFs that is isorecticular to zeolites namely Zeolitic Imidazolate Framework (ZIFs). These compounds have shown in previous works electrocatalytic activity for CO₂ reduction

Methods: In order to carry out this application, ZIF-8 is chosen for its excellent thermal and chemical stability. For this purpose, it is necessary to deposit the compound onto a conductive substrate, in this case, FTO. ZIF-8 was grown in situ on TiO₂ microcolumns that were previously deposited on the FTO substrate by chemical vapour deposition (CVD). The MOFs crystal deposition was optimised varying the initial conditions of ZIF-8 synthesis.

Results: To evaluate the correct synthesis of the compound, the films were characterised by Fourier Transformed Infrared Spectroscopy (FT-IR), grazing-angle XRD and Scanning Electron Microscopy (SEM). An optimisation of synthesis was successfully reached. XRD results show that the compound is crystalline and corresponds to a ZIF-8 phase. IR results also confirm the correct formation of ZIF-8 and SEM images allow see that the compound grew between the columns. The compound appears to have a catalytic activity however the experiments still continue.

Conclusions: The compound is successfully deposited and synthesis was optimised. It has crystalline structure, grew between the columns and it corresponds to ZIF-8. Catalysis results are not still conclusive but sensations are positive

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