A synthetic manganese–calcium cluster similar to the catalyst of Photosystem II : challenges for biomimetic water oxidation.

Autorzy

Younes Mousazade

Mohammad Reza Mohammadi

Robabeh Bagheri

Rahman Bikas

Petko Chernev

Zhenlun Song

Tadeusz Lis

Miłosz Siczek

Nader Noshiranzadeh

Stefan Mebs

Holger Dau

Ivelina Zaharieva

Mohammad Mahdi Najafpour

Rok wydania

2020

Czasopismo

Dalton Transactions

Numer woluminu

49

Strony

5597-5605

DOI

10.1039/d0dt00536c

Streszczenie

Herein, we report the synthesis, characterization, crystal structure, density functional theory calculations, and water-oxidizing activity of a pivalate Mn–Ca cluster. All of the manganese atoms in the cluster are Mn(IV) ions and have a distorted MnO_6 octahedral geometry. Three Mn(IV) ions together with a Ca(II) ion and four-oxido groups form a cubic Mn_3CaO_4 unit which is similar to the Mn_3CaO_4 cluster in the water-oxidizing complex of Photosystem II. Using scanning electron microscopy, transmission electron microscopy, energy dispersive spectrometry, extended X-ray absorption spectroscopy, chronoamperometry, and electrochemical methods, a conversion into nano-sized Mn-oxide is observed for the cluster in the water-oxidation reaction.

Adres publiczny

http://dx.doi.org/10.1039/d0dt00536c

Strona internetowa wydawcy

https://www.rsc.org/

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł