

Insights: Publications

Truly Monodisperse Molecular Nanoparticles of Cerium Dioxide of 2.4 nm dimensions: A {Ce₁₀₀O₁₆₇} Cluster

Angewandte Chemie International Edition

March 26, 2021

Written by **Javier Lopez-Nieto**

Ultra-small nanoparticles of CeO₂ obtained in molecular form, so-called molecular nanoparticles, have been limited to date to a family whose largest member is of nuclearity Ce₄₀ with a {Ce₄₀O₅₈} core atom count. Herein we report that a synthetic procedure has been developed to the cation [Ce₁₀₀O₁₄₉(OH)₁₈(O₂CPh)₆₀(PhCO₂H)₁₂(H₂O)₂₀]¹⁶⁺, a member with a much higher Ce₁₀₀ nuclearity and a {Ce₁₀₀O₁₆₇} core that is more akin to the smallest ceria nanoparticles. Its crystal structure reveals it to possess a 2.4 nm size and high D_{2d} symmetry, and it has also allowed identification of core surface features including facet composition, the presence and location of Ce³⁺ and H⁺ (i.e. HO⁻) ions, and the binding modes of the ligand monolayer of benzoate, benzoic acid, and water ligands.

Related People



Javier Lopez-Nieto

t 404.532.6882

jlopeznieto@ktslaw.com