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| Title: | How Does "Wormhole" Mesoporous γ -Alumina Matrix Direct the Morphology of Pt Nanocrystals? |
| Authors: | Jana, Debrina (/jspui/browse?type=author&value=Jana%2C+Debrina) De, G. (/jspui/browse?type=author&value=De%2C+G.) |
| Keywords: | Demonstrates Formation Experimental evidence |
| Issue Date: | 2019 |
| Publisher: | American Chemical Society |
| Citation: | Crystal Growth and Design,19(3), pp.1494-1501. |
| Abstract: | This study demonstrates experimental evidence of formation of different discrete shaped Pt nanocrystals inside a mesoporous γ -alumina film at 500 °C. Shape and size of the finally formed nanocrystals are found to be dependent on the concentration of surfactant used to form the porous structure, as well as the precursor salt solution. Electron microscopic characterization at different temperature intervals during the growth of nanocrystals reveals the nucleation of small nanoparticles and their clustering and growth toward the formation of pyramidal, rhombus, cuboid, and bean-shaped nanocrystals in the mesoporous alumina matrix. The study finds that "wormhole" type mesoporous γ -alumina is the key medium for the generation of these nanostructures which are not formed while using hexagonally ordered mesoporous alumina. From the experimental evidence, we attempted to understand the formation mechanism of Pt nanocrystals in the mesoporous γ -alumina film matrix. This study is expected to open up new direction in the shape- and size-controlled synthesis of nanoparticles inside a mesoporous support matrix. |
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