Size-controlled synthesis of catalytic cerium oxide nanoparticles

Technology #m01-057

Cerium oxide nanoparticles are useful catalysts for polymerization, reforming fuels, and reducing toxic automobile emissions in catalytic converters. This technology, a method for synthesizing cerium oxide nanoparticles, allows the examination of size-dependent effects on catalytic performance. As a result, nanoparticles produced with this technology can be used for catalyst research and production.

Scalable preparation of crystalline cerium oxide nanoparticles in specific sizes.

Size-controlled synthesis of cerium oxide nanoparticles is achieved by combining a cerium nitrate solution with an ammonium reagent in rapid mixing apparatus. The rapid mixing allows control over nanoparticle size that is difficult to achieve using other methods. This method also produces cerium oxide nanoparticles that are crystalline. The mixing apparatus can also be easily scaled up to synthesize large batches of nanoparticles.

Size-controlled synthesis of crystalline cerium oxide nanoparticles ranging from 3-12 nm has been demonstrated on a 70 gram scale.

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Applications:

- Preparation of cerium oxide nanoparticle catalysts for polymerization, fuel reform, and automobile emissions conversion.
- Synthesis of crystalline cerium oxide nanoparticles in specific size ranges.
- Research effects of cerium oxide nanoparticle size on catalytic performance.

Advantages:

- Rapid synthesis allows control over cerium oxide nanoparticle size.
• Synthesis is adaptable to large-scale preparation of cerium oxide nanoparticles.
• Preparation of near-perfect crystalline cerium oxide nanoparticles with few lattice defects.

**Patent information:**

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**Related Publications:**


**Inventors**

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