**CORE-SHELL NAOPARTICULATE COMPOSITIONS AND METHODS**

Embodiments of core-shell nanoparticles and methods of preparing the same

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**Brief description**

The present invention relates to catalytic materials and core-shell nanoparticles, core-shell nanoparticles superposed on metal oxide support, and methods for making the same. Some embodiments of the invention provide for core-shell nanoparticulate compositions, each composition comprising late-transition-metal core encapsulated by metal oxide shell. Other embodiments of the invention provide for method of preparing core-shell nanoparticles.

**Innovative aspects and main advantages**

The present invention improves today's processes of emissions-control catalysts systems. The release of unburn methane during homogenous combustion is a serious problem. In heterogeneous catalysts methane oxidation must be very active at low reaction temperatures.

**Applications**

This invention may be deployed to enhance the performance of catalytic activity at low temperatures. It also limits deactivation mechanisms improving various catalytic processes, including hydrocarbon combustion processes.

**Potential market**

Power generation and heating applications are main industries of this invention.

**Development status**

Invention available to the market.