SYNTHESIS OF NANOPARTICLES

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HINTERGRUND

The synthesis of specific nanomaterials by atomization and combustion of solutions of suitable precursor mixtures in the form of spray flames has high potential. When producing monodisperse nanoparticles within such systems, it is crucial to use laminar flames.

PROBLEMSTELLUNG

So far, this is only possible in small-scale systems, as with a scaling up to larger system almost always flames with at least a turbulent proportion arise.

The large-scale production of monodisperse nanoparticles by means of the spray flame synthesis is therefore far not or only with great difficulty possible.

The object of the present invention is now to solve this problem.

LÖSUNG

The technology presented here provides a process for the large-scale synthesis of monodisperse nanoparticles in spray flames. For this purpose, a precursor mixture of metal salt and fuel is injected into a pre-conditioned gaseous input stream, whereby the fuel completely evaporates before it comes to a self-ignition of the mixture. The combustion thus takes place with an ignition delay, wherein the atomization and evaporation of the precursor solution are already completed.

The most important parameters in this process are the ignition delay time and flow velocity, as they account for the functionality of the process.

VORTEILE

- Production of nanoparticles with unimodal size distribution
- Nanoparticles have a Standard deviation between 1.8 and 2.2
- Large-scale production seems possible
ANWENDUNGSBEREICHE

The nanoparticles produced by the present process can be used in a variety of ways. Depending on their properties, the nanoparticles may be used as coating material, in electrical equipment, for heat conduction or thermal insulation, or as catalysts.

In addition, this method of ignition can also be used in the so-called sequential combustion, as used for example in gas turbines.

SERVICE

Possible cooperation:

• R&D Cooperation
• Patent Sale
• Licensing