Technology Offer

TT-Ref. 2009-034

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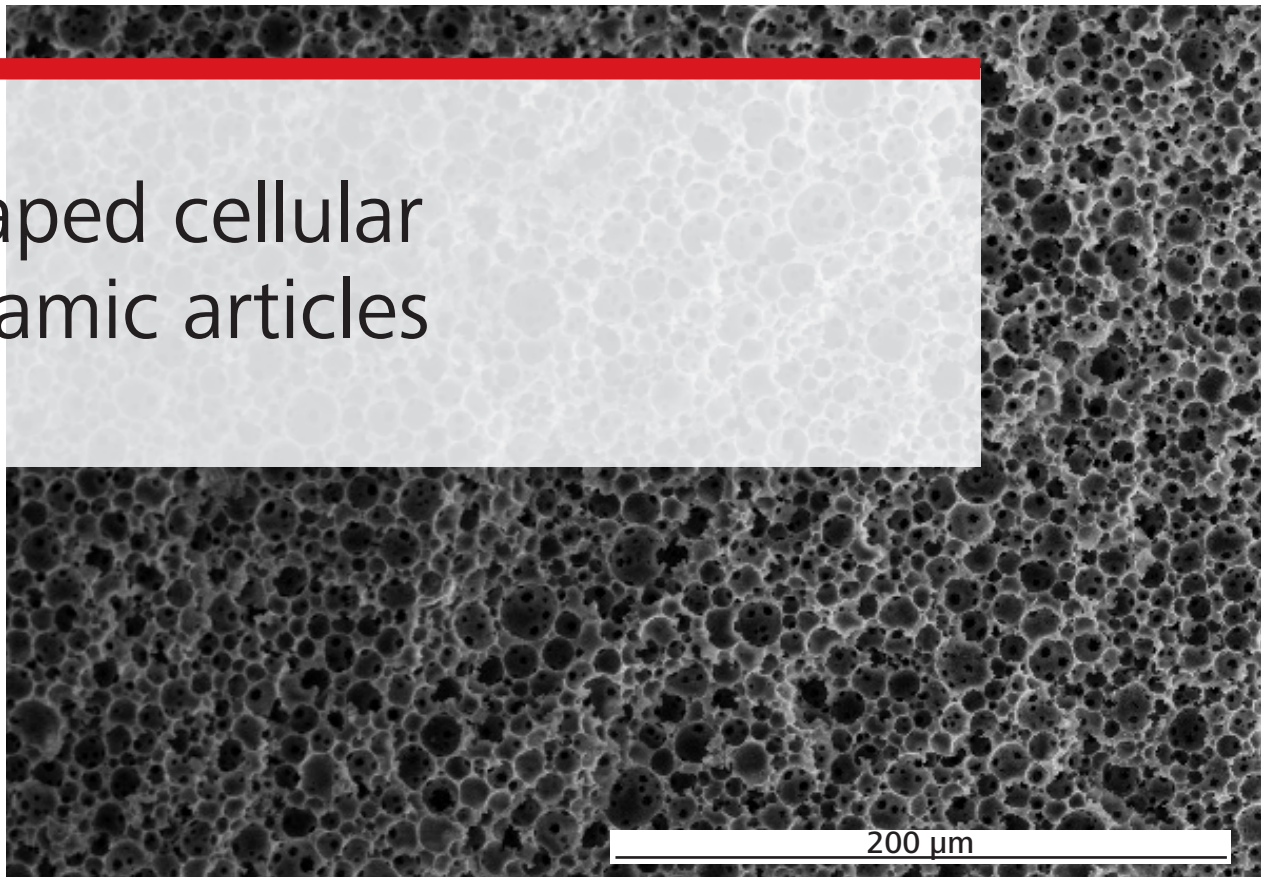
Materials Science & Technology

Shaped cellular ceramic articles



Invention

The invention covers a novel and general shaping method to produce a variety of cellular ceramic articles. Precise control of porosity and cell size geometry is possible due to a novel feedstock used. The shaping technique enables the production of cellular ceramic articles in the shape of continuous fibers, tubes and tapes as well as (micro)spheres from practically any inorganic material. In addition, multilayer cellular coatings or self supporting multilayer monoliths with attractive gradient structures can be produced.

Background

Cellular ceramic articles have paramount importance in the fields of separation, filtration, catalysis, thermal and acoustic insulation, renewable energy, light structures, implants, biocompatible and smart materials. Precise and independent control of porosity, cell structure (shape, size distribution, wall thickness, open/close nature) is achieved with the novel feedstock composition. Furthermore, a wide variety of primary shapes, tailored for different applications, such as continuous fibers, tubes or tapes, (micro)spheres, multilayer coatings and bricks are enabled.

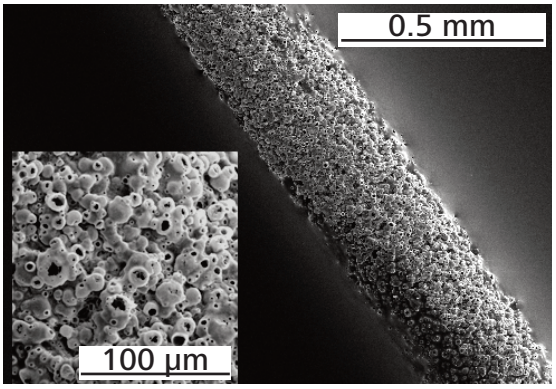
Advantages

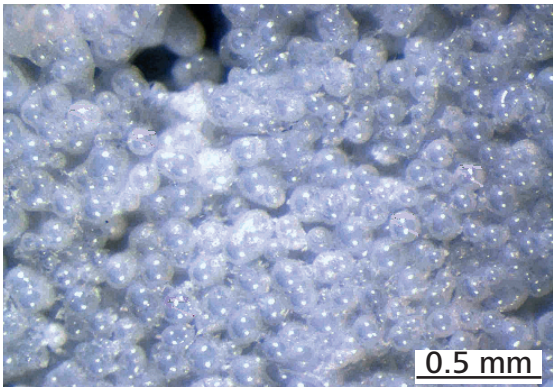
The invention allows custom-made, cost-effective and mass-manufacturable solutions for cellular inorganic materials in a variety of shapes with well controlled cell geometry. Porosity, cell size and shape can be varied in a wide range. Cellular articles of Al2O3, SiO2 and hydroxyapatite with porosities up to 85% and cell sizes between 4 and 200 micrometers have been demonstrated. Multilayered processing enables the production of homogeneous/heterogeneous gradient or alternating materials for smart materials and devices, and optimized

or finished products. Three-dimensional microfabrication of individual layers gives additional advantages and flexibility of design. Complex bodies can be made from single or multiple layers.

Applications

The technology provides advantages for applications in many different fields including catalysis, separation/filtration, light structures, implants, thermal and acoustic insulation and smart materials. Cellular and non-cellular (micro)spheres can also be used in applications where good flow behavior is required. Specific examples include cellular alumina materials for high temperature insulation, cellular hydroxyapatite materials as bone substitution.





Ownership

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Keywords

Cellular, foam, ceramic, (micro)sphere, fiber, multilayer coating, gradient materials

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