Fabrication of Functional Porous Ceramics by Gel-Casting and Its Applications

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Porous ceramics are very widely used in many industrial applications, such as filters, catalyst for chemical industries and automobiles, light weight structural materials, biomaterials and so on. Among various processing technologies to fabricate porous ceramics, gel casting has gained much attention due to easy processing and easy to develop any complicated shape. We have successfully developed several materials with tailored pore structure such as ceramic filter, super-porous construction materials, and electrically conductive ceramics. Controlling the pore shape and size by gelcasting of slurry involving bubbles provides an effective and cheap way in fabricating porous ceramics. Various types of foamed slurries can be in-situ solidified by polymerization of monomer. This process also allows a development of endless recycling system of waste resources to produce ceramic materials with characteristics such as sound absorbance, super lightness, high insulation and easiness in machining.