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FORMATION POROUS CERAMICS STRUCTURE BURNING ADDITION CRYSTALLIZATION IN THE SLURRY

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Porous ceramics is wide used as catalysts, ceramic membranes, porous electrodes, biomaterials etc. There are different methods of obtaining porous ceramics, but impossibility to control of pore morphology is the main disadvantage of these methods. Thus researches of porous material obtaining with possibility of pore space morphology control are advanced. In recent years, freeze-casting method is studied for obtaining of new types of porous materials very active[1].

In this study the freeze-casting method has been used to obtain porous ceramics with defined pore morphology with using of micron zirconia powder. Saturated solution of urea was used as crystal-forming additive. Three different forms (plastic, metal and polyurethane form with a metal bottom) were researched for optimized material selection of form for casting and observation of crystal growth in the slurry of urea. For achievement required temperature gradient different variants of form cooling with «ZrO_2-urea» slurry were choice: 1)sudden temperature change from 80 ºC to -5ºC, 2) a gradual, slow temperature change from 80 ºC to 23ºC.

As a result it was found that in the received cast urea crystals have a large order but small size of crystals because of crystals growth high rate. Porosity of sintering samples molded with slow cooling suspension is a bigger then samples porosity molded with sudden cooling suspension (62% and 57% respectively). Samples prepared in metal and polyethylene forms have a distinct pore structure in the forms of needles at the same conditions of formation and cooling.

References

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