

Preparations and characterizations of low-cost porous ceramic membranes

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Porous ceramics are widely studied for their superior thermal and chemical stability compared to porous metals and polymers. Reticulated porous ceramics, in particular, offer low density and high permeability, making them promising for air filtration, although their relatively low compressive strength still limits broader application. Porous ceramic membranes have also gained importance in water treatment due to their robust thermal and chemical resistance. To reduce manufacturing costs, increasing attention has been given to low-cost raw materials such as diatomite, kaolin, pyrophyllite, and silicon carbide.

This study explores strategies to enhance the compressive strength of low-cost reticulated porous ceramics by optimizing process parameters including solid loading, particle size, and additives in ceramic slurries. In addition, we investigate the fabrication of extruded porous ceramic membranes with controlled pore characteristics—average and maximum pore size, pore distribution, and structure—while maintaining desirable mechanical strength and permeability. The analysis includes pore properties (density, size, and morphology), sintering behavior (linear shrinkage), and mechanical performance (compressive and flexural strength). Characterization techniques such as scanning electron microscopy, mercury porosimetry, capillary flow porosimetry, and dead-end microfiltration with particle counting are employed to systematically evaluate air and water permeability.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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