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Highly Porous Fibrous Mullite Ceramic Membrane with Interconnected Pores for High Performance Dust Removal

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ABSTRACT

Porous fibrous mullite ceramic membranes with different content of fibers were successfully fabricated by molding method for dust removal. The properties of the samples, such as microstructure, porosity, bulk density and mechanical behavior were analyzed. Owing to the highly porous three-dimensional structure of ceramic membranes, all the samples exhibited low density (lower than 0.64 g/cm³), high porosity (higher than 73%), low linear shrinkage (lower than 1.0%) and low thermal conductivity (lower than 0.165 W/mK). Significantly, the as-prepared porous ceramic membrane possessed of enhanced dust removal efficiency with almost 100% for 3-10 μm, 97% for 1.0 μm, 87% for 0.5 μm and 82% for 0.3 μm dust particles in diameter from dust-laden air passed through the test module. Moreover, the pressure drop was lower than 80 Pa when the airflow linear velocity reached 1.25 m • min⁻¹. The results indicated that the ceramic membranes prepared in this work were promising high

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