Pollution Mitigation Using Porous Refractory Substrates Fabricated from Fly Ash

C. Eric Ramberg[1] & Stephen A. Dynan[2],

Errcive, Inc.
[1] 831 Sierra Vista Avenue, Mountain View, CA 94043
[2] 118 Ramsey Way, Boalsburg, PA 16827

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Criteria pollutants such as particulate matter and NOx are emitted by virtually all pre-2007 diesel engines. Criteria pollutants cause cardiovascular health problems, contribute to premature melting in Boreal climate zones, and are powerful absorbers of solar energy. While new diesels are relatively clean, appreciable reduction in the emissions inventory requires retrofitting the oldest, largest, diesel engines with cost-effective pollution mitigation equipment. However, the cost of currently available technology prohibits wide scale adoption, and solutions do not exist for the largest engines and engines running high sulfur fuels. This paper presents preliminary results on the fabrication and characterization of uncatalyzed diesel particulate filter (DPF) substrate materials. These fly ash structures have high open porosity (up to 70%), honeycomb flow channels, and thermomechanical stablity to temperatures over 1000 C.

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