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Zirconia Toughened Alumina Reticulated Foam Filters

**Quarterly Report
October 1 - December 31, 1997**

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I. Progress Summary

Work during this period focused on making foam and membrane samples from the ceria zirconia toughened alumina developed in our previous SBIR program. After some adjustment very strong samples which have reasonably good working characteristics. The initial pressure drop measurements through the membrane suggest that it will need to be made with a more open structure.

II. Progress by Task

Referring to the tasks in the statement of work on page 15 of the project proposal:

Task 1- NEPA Compliance - The documentation was prepared and submitted for this determination.

Task 2- Filter Element Development - Ceramic foam bars were produced to confirm that high modulus of rupture could be achieved at low density. MOR's exceeded 800 psi at a density of 16-18% of theoretical.

Design of the forming die was also started.

Task 3 - Membrane development- Initial samples made with the ceria zirconia alumina had server cracks upon drying. This problem was overcome by increasing the boehmite component of the slurry at the expense of calcined alumina. This greatly increased the green strength and eliminated cracking while leaving the final fired composition unchanged.

An air flow measurement rig was constructed and initial samples tested. Initial tubular samples with porous membranes had flow rates much lower than desired:

Sample	Density, %	flow rate at 6 mbar, l/min/cm ²
Target 0.3 l		
1	43	0.006
2	20	0.085

Clearly, the membrane must be made with a lower resistance. We will experiment with lower density, lower thickness and increased pore-to-pore connections.

III. Financial Status

The attached table show costs incurred through December 1.

Kenneth Butcher