

PROJECT facts

Advanced Research

11/2003

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



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PROJECT COST

DOE SBIR Phase I: \$99,878

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov
www.science.doe.gov/sbir

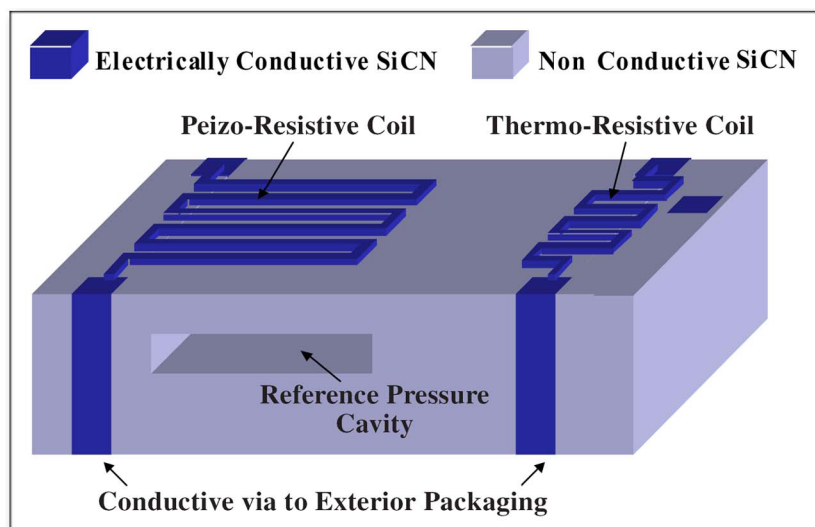


SiCN HIGH TEMPERATURE SENSOR SUITE

This SBIR project is focused on creating a MEMS based sensor for measuring pressure and ultra-high temperatures in extremely demanding applications. Energy related applications include turbines, solid oxide fuel cells, post gasification and combustion gas streams. The goals of the project are to design and develop an integrated sensor that reaches new boundaries in sensing capabilities and can survive and perform in caustic conditions for extended periods of time. The use of established manufacturing practices will be employed to offer low cost sensors with repeatable device-to-device performance.

Phase I efforts will examine the effect of annealing temperature and doping of the SiCN material on the piezoelectric properties. Theoretical sensor design for various pressure ranges (up to 1000 psi) and temperature measurement in the range of 500-1500 °C will be completed using analytical and numerical models followed by select experimental verification.

Progress thus far has shown SiCN and doped SiCN have excellent high temperature material properties that should result in high micro device durability and that these devices can be made with favorable manufacturing options.



Product Conceptualization