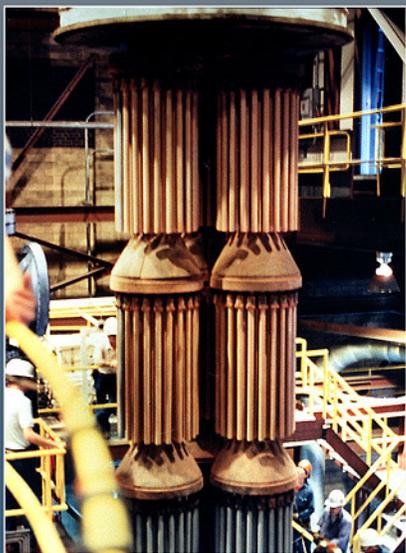


Ceramic Composite Hot Gas Filters Are Being Fabricated Using a Fiber Slurry and Sol-gel Impregnation Process

McDermott Technology is developing a fiber slurry and sol-gel impregnation process (a liquid precursor converted to solids) to produce porous tubular composites. The process is a combination of filament winding and vacuum forming and is ideal for oxide-based composite systems.



Hot gas candle filters are porous closed-end tubes that can be used to remove fine particles from fluidized bed combustion and other process systems.



Advantages of CFCC hot gas candle filters include:

- *improved reliability and resistance to thermal shock over monolithic ceramic components*
- *significantly higher resistance to corrosion than metal filters, allowing operation at higher temperatures*

Research performed at



Research and Development Sponsored by
Industrial Materials for the Future (IMF) Program,
Office of Industrial Technologies, Energy Efficiency and Renewable Energy,
U.S. Department of Energy



CFCC Candle Filters

McDermott Technology fabricates porous hot gas candle filters. Hot gas candle filters can be used to remove fine particles from fluidized bed and other systems in the chemical and refining industries. CFCC filters are being evaluated for contaminant removal in streams operating at 600 to 1800°F. Due to their toughness and thermal shock resistance, CFCCs overcome current filter failures, such as the inability to survive back-pressure pulses used for cleaning. CFCC cleaning systems will reduce emissions and costs, increase product yield and efficiency, and protect downstream equipment from wear.

Significant achievements have been realized in this project:

- Developed CFCC candle filter tubes that meet the specifications of the application and can be reproduced by the modified filament winding process.
- Tested sub-size tubes at Westinghouse Electric in laboratory apparatus and in a simulated pressurized fluidized bed combustion (PFBC) test facility.
- Fabricated and installed full size CFCC candle filter tubes in a plant in Karhula, Finland. These tubes operated successfully for 580 hours.
- Installed hot gas filters at the Power System Development PFBC facility of Southern Company Services in Wilsonville, Alabama. The filters have successfully accumulated over 1500 hours exposure.

Contacts:

Richard Wagner
McDermott Technology, Inc.
Lynchburg Research Center
P.O. Box 11165
Lynchburg, VA 24506-1165

Phone: (804) 522-5697
E-mail: rich.a.wagner@mcdermott.com

Richard Goettler
McDermott Technology, Inc.
Lynchburg Research Center-MC 76
P.O. Box 11165
Lynchburg, VA 24504-11165

Phone (804) 522-6418
E-mail: richard.w.goettler@mcdermott.com

Ted Besmann
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6063

Phone: (865) 574-6852
E-mail: bessmanntm@ornl.gov

William Ellingson
Argonne National Laboratory
9700 S. Cass Avenue
Building 212 ET
Argonne, IL 60439-4838

Phone: (630) 252-5068
E-mail: ellingson@anl.gov

Peter Angelini
Oak Ridge National Laboratory
1 Bethel Valley Rd.
Oak Ridge, TN 37831-6065

Phone: (865) 574-4565
E-mail: angelinip@ornl.gov

Charles A. Sorrell
Department of Energy
EE-23
1000 Independence Ave. SW
Washington, DC 20585

Phone: (202) 586-1514
E-mail: charles.sorrell@hq.doe.gov