

## **President Bush Visits 3M; Recognizes Company for Leadership in Research and Development**

President George W. Bush toured a laboratory during a visit today to 3M and recognized the company for its leadership in research and development in his remarks to employees about America's global competitiveness.

From microreplication and optical films, to composite conductors for transmission grids, and fuel cell components for clean power, the president saw firsthand how 3M's nanotechnology-based products are addressing issues for 3M customers and for the nation.

"We're honored by President Bush's visit today and the opportunity to share some exciting examples of cutting edge technology developed by our talented researchers," said George W. Buckley, chairman, president and CEO.

The following background information describes the technologies demonstrated to the president during his laboratory tour:

### **Microreplication and Optical Films**

Microreplication has a long history in 3M, beginning in the 1960s when it was used to make overhead projectors for meetings and classrooms. In the 1980s it was extended to make highway signs more visible at night. The technology was further advanced in the late 1990s using nanotechnology to create optical films for liquid crystal displays (LCD). In products ranging from cell phones to LCD televisions, displays using 3M's Vikuiti brand optical films are significantly brighter than those without optical films. Future applications include solar control for buildings.

Many 3M films contain patterns, designed to turn or reflect light, that are created on a one-of-a-kind diamond turning machine. On this machine, 3M measures to one nanometer resolution, and achieves physical features so small that 700 of them will fit on a human hair. For perspective, one human hair equals 70,000 nanometers, and nanotechnology is in dimensions 100 times smaller than the human hair. The patterns are later embossed on plastic and produced by the mile on machines much like newspaper presses, but far more precise.

### **Composite Conductors**

Bottlenecks exist in our nation's overhead transmission grid. These bottlenecks limit the flow of power from where it is generated to where it is needed, which can result in blackouts such as in August 2003. For over 70 years the conventional solution has been to build a new transmission line. The problem is that it's difficult to obtain new land and permitting can take years.

3M has developed a technical solution - a new high performance composite conductor that carries twice the power and can be used on the existing towers. Key to the technology is a 3M material used in the core of the cable, which replaces the steel used in conventional cables. It is strong, lightweight and sags less. The high performance is a result of 3M's ability to control the nano-crystalline structure of the ceramic fibers.

### **Fuel Cell Components**

Fuel cell systems provide critical power for extended periods, using pure hydrogen and oxygen from air to make electricity and water. 3M makes the heart of these fuel cells, the critical part that actually turns the hydrogen and oxygen into electricity, called membrane electrode assemblies. 3M membrane electrode assemblies enable

a cleaner and more efficient power source for dependable, clean power in critical telecommunication, aviation, and security applications.

Today, 3M is the world-leading volume manufacturer of membrane electrode assemblies, and the only manufacturer in the world to have dedicated pilot production lines for roll-good component materials and robotically controlled assembly lines. The current generation of membrane electrode assemblies incorporates unique 3M core technology in microreplication and roll-to-roll processing.

For nearly 10 years 3M has worked closely with the Department of Energy to develop the next generation membrane electrode assembly technology for improvements in cost, performance and durability for future use in automobiles.

#### About 3M - A Global, Diversified Technology Company

Every day, 3M people find new ways to make amazing things happen. Wherever they are, whatever they do, the company's customers know they can rely on 3M to help make their lives better. 3M's brands include Scotch, Post-it, Scotchgard, Thinsulate, Scotch-Brite, Filtrete, Command and Vikuiti. Serving customers in more than 200 countries around the world, the company's 69,000 people use their expertise, technologies and global strength to lead in major markets including consumer and office; display and graphics; electronics and telecommunications; safety, security and protection services; health care; industrial and transportation. For more information, including the latest product and technology news, visit [www.3M.com](http://www.3M.com).

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