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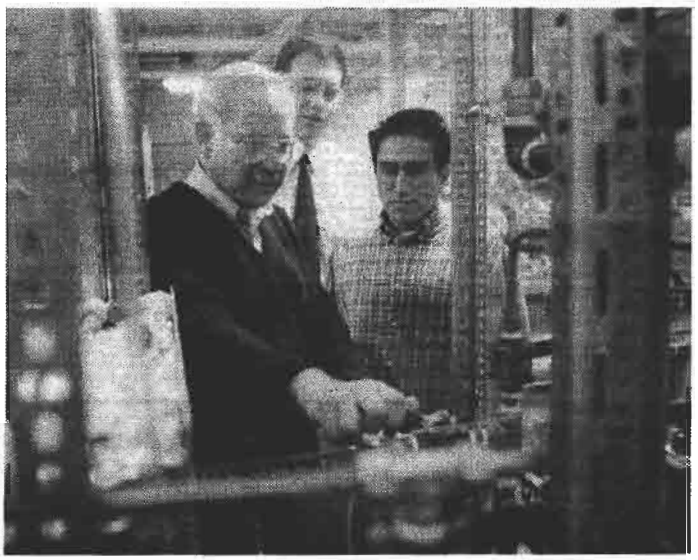


Phillip Schmidt, left, a professor of mechanical engineering at the University of Texas, is developing a solvent-recovery system that 3M may put to the test soon. Graduate students Martin Salinas, right, and David Price watch Schmidt work on his device.

CASH FROM THIN AIR: CLEANING UP ON SOLVENTS

UT device to control pollution, save money nears its trial run

BY DICK STANLEY
American-Statesman Staff

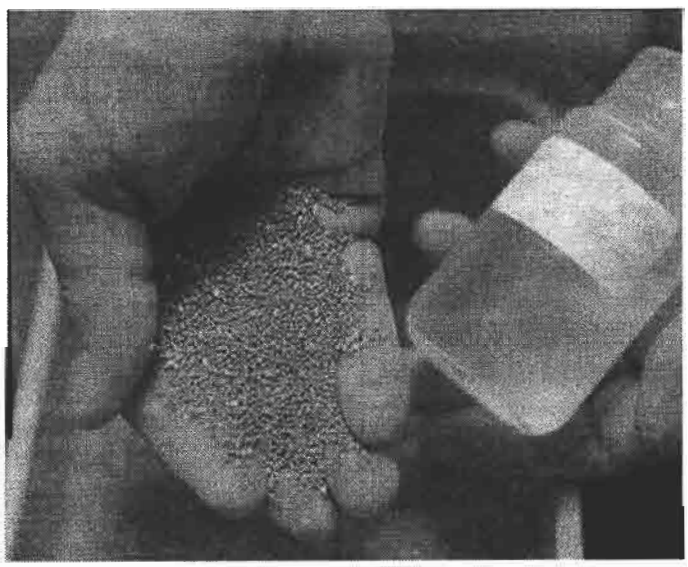
Austin's 3M Corp. could soon begin testing a new University of Texas pollution-control device that helps manufacturers save money while complying with federal clean-air standards.

Printing, microchip and other manufacturers invest millions of dollars to install and maintain incinerators that burn chemical solvents left over from industrial processes before they can pollute the air.

The UT device, which incorporates a chemical-cooking microwave oven, would let companies recover the expensive solvents — called volatile organic compounds — instead of burning them.

"The burning works; it's just expensive," said John Davis, an associate professor of electrical and computer engineering, who is co-developing the device with Phillip Schmidt, a professor of mechanical engineering.

Added Schmidt: "They can actually make money by reusing or selling the solvents. Getting them back has to be better than destroying them."



Phillip Schmidt shows a handful of adsorbent granules used in his solvent-recovery process and a bottle of liquid extracted by the device.

Volatile organic compounds are chemicals such as gasoline, alcohol and solvents in paint and ink that evaporate easily, polluting the air. Used to clean surfaces before the surfaces are coated with other substances, the compounds are common in industrial printing and coating, and in metal and microelectronics fabrication.

Vented into the atmosphere, the solvents add to the destruction of the Earth's upper-atmospheric ozone shield against ultraviolet light from the sun and the greenhouse gases that have been implicated in global warming.

"Companies have to heat an enormous amount of air to clean (the solvents) up, so they're wasting the solvents and the natural gas to burn them," Schmidt said.

Development of the UT alternative is being supported by 3M Corp., Dow Chemical Co., Borden Inc., Environmental C&C Inc., the Environmental Protection Agency and the state's Advanced Research/Advanced Technology program. Together, they have contributed more than $600,000.

Schmidt, Davis and their graduate students at UT's Center for Energy Studies have spent the past six years studying the basic science and technology of their device. Called a column, it resembles a microwave oven built around a wide glass pipe.

Solvent-containing gases are funneled through the pipe, which is filled with granules of a special material called adsorbent.

Air passes freely through the adsorbent, but organic molecules from the solvents stick to the adsorbent granules. When they are saturated, the granules are bombarded with microwaves, which

UT solvent-saving device nears tryout

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release the solvents as a vapor to be liquified in a heat exchanger and stored for later use.

Doug Wilcox, head of environmental affairs for 3M Corp., said the company is considering installing a test model of the device in January or February at its North Austin plant at 11705 Research Blvd. The plant is a pilot facility for assembling diagnostic tools for telecommunications equipment.

Wilcox said 3M is very interested in the UT device for recovery of solvents 3M uses in adhesives. "It appears to be a lot cleaner (than burning the solvents), more efficient and might save us some money," Wilcox said.

While estimates of potential savings vary widely, Schmidt said engineering calculations and tests in UT labs show that even the cost of electricity to produce the microwaves can be offset by savings from the recovered solvents.

"We recover 25 pounds of solvent an hour out of the (test microwave) column," Schmidt said. "For a lot of applications, this would be the full scale."

The UT engineers have designed and operated the components of a commercial-scale microwave system for the 3M tests.

If they are successful, Schmidt and Davis expect fully operational commercial versions of the recovery system to become available within the next two or three years.

It will take that long to refine everything for trouble-free operation.

The Environmental Protection Agency, which enforces clean-air rules, wants a system "to run all the time and meet all the standards," Schmidt said. "They want companies to be able to set it and forget it. We can't send graduate students around to baby-sit it."