

PREHEATED CATALYTIC CONVERTER CUTS POLLUTION

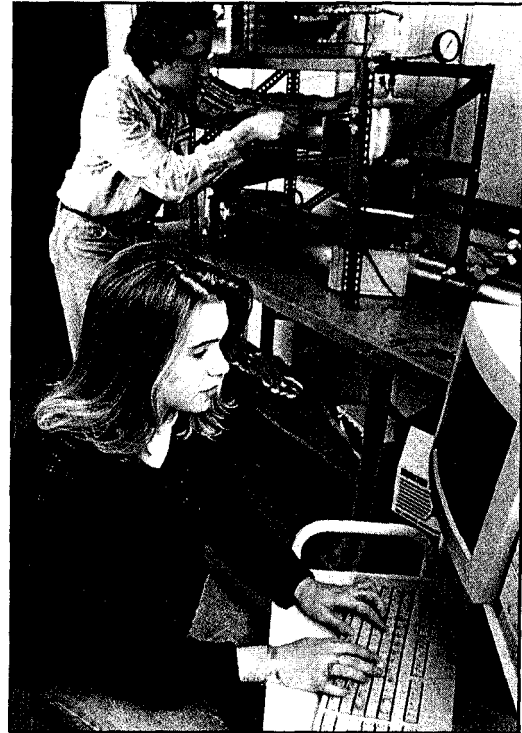
Toxic byproducts of gasoline combustion are changed to water and carbon dioxide when routed through a catalytic converter. However, engine start-ups still emit hazardous gases because the converter only works after it is warmed up. To solve this problem, a Tuft's University mechanical engineering professor and a team of graduate and undergraduate students developed a working prototype of a catalytic converter that preheats itself before the engine starts.

Ioannis N. Miaoulis, assistant professor of mechanical engineering at Tufts and director of the Thermal Analysis of Materials Processing Laboratory, created a device that relies on a heat-producing chemical reaction to warm the catalytic converter before the engine is on. The problem, he noted, was storing the heat generated by the car when it is not running.

Miaoulis' heat exchanger is based on a simple chemical reaction using a salt called lithium bromide that gives off heat when it is wet. He built a metal cocoon filled with lithium bromide for the catalytic converter. When the driver enters the car, he pushes a button on the dashboard that releases water with antifreeze from the storage area into the lithium bromide, warming the catalytic converter.

As the car's engine heats up, warm exhaust funnels into the cocoon and dries the lithium bromide. It then stores heat until the next time it is needed. The heat exchanger could also warm the battery for quick starts on frigid mornings, or generate heat in the passenger cabin.

Miaoulis plans to install his patented preheater in a production vehicle by next spring. The research is funded by the Center for Environmental Management at Tufts, an independent research and policy center, and the Cincinnati office of the U.S. Environmental Protection Agency.



Students at Tufts University's College of Engineering work on the catalytic converter preheater project using a large-scale prototype and testing rig.

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