

Study Shows Catalytic Converters Release Potentially Toxic Elements

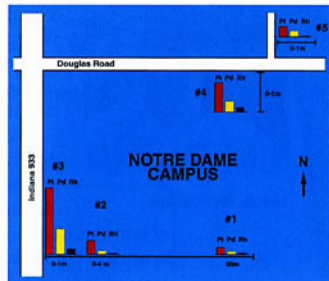
catalytic converter. The converter takes the carbon monoxide (CO) and hydrocarbons given off as waste from the combustion of gasoline in a vehicle's engine and "converts" them into water and carbon dioxide (CO₂). Catalytic converters also transform nitrous oxides into nitrogen gas. Since water, nitrogen, and CO₂ all cycle through the environment naturally, they were thought to be safer than CO and hydrocarbons. A recent study conducted by researchers from Notre Dame's Center for Environmental Science and Technology (CEST) and published in *Environmental Science & Technology*, a journal of the American Chemical Society, suggests that catalytic converters are dispersing platinum group elements (PGEs) along roadways.

The catalyst in a converter is typically made up of platinum, palladium, and rhodium, (PGEs). These toxic elements coat the ceramic honeycomb housed in the converter. The study shows that PGEs are emitted as microscopic particles from a vehicle's tailpipe. Although the amount and rate of PGE release from a converter is affected by a number of factors — the speed of the vehicle, the type of engine, and if any fuel additives have been used — the study proves that potentially harmful levels of PGEs have been deposited on roadsides as far as 50 meters

Since the 1980s federal law has required that all new automobiles feature a

from the roadway. Although the effects of palladium and rhodium are not known at this time, platinum is an allergenic, and consistent exposure to it, even at low levels, can lead to asthma, sensitive skin, or other symptoms. University researchers have noted that allergic reactions may not be the only consideration, since it is not yet known if the PGEs are leaching into groundwater supplies or the food chain.

The research team includes **Clive R. Neal**, associate professor of civil engineering and geological sciences and director of the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) research facility; Charles F. Kulpa Jr., professor of biological sciences and director of CEST; and Jinesh Jain, manager of the ICP-MS facility; James C. Ely, a post-doctoral student; and James C. Seidler, an engineering undergraduate. Mark A. Schneegurt, an assistant professor of biological sciences at Wichita State University, also participated in the study.



Notre Dame researchers collected soil samples from local roads and side streets as well as along Interstate 80 between South Bend, Ind., and Chicago. Samples were collected at 5, 10, and 50 meters from the roadway and tested for platinum group elements. Not tested as part of the study were the effects of small gas engines found on household tools like lawn mowers or chain saws, which are required to use catalytic converters by the Clean Air Act of 1990.