



NOTRE DAME NEWS

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From: William G. Gilroy

A study conducted by researchers from the University of Notre Dame's Center for Environmental Science and Technology (CEST) suggests that catalytic converters on automobiles are dispersing potentially toxic elements along U.S. roadsides.

Published in the American Chemical Society's journal *Environmental Science & Technology*, the research is the most detailed study of roadside contamination by catalytic converters to date.

Catalytic converters have been in use on U.S. automobiles since 1975 to remove gaseous pollutants, such as carbon monoxide and hydrocarbons, from exhaust. The devices promote chemical reactions that change these pollutants into less harmful emissions.

The material used to speed up these reactions is filled with platinum, palladium and rhodium, known as platinum-group elements, or PGEs. The PGEs are emitted as microscopic particles from an automobile's tailpipe. The amount and rate of PGE release from catalytic converters is affected by a number of factors, including the speed of the automobile and the type of engine and fuel additives.

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PGE accumulation...add 1

The Notre Dame researchers collected soil samples from urban roads and side streets in and around South Bend, Ind., where Notre Dame is located. They also traveled to sites along Interstate 80 between South Bend and Chicago and collected roadside and soil samples at 5, 10 and 50 meters from the road.

The study showed that potentially harmful levels of PGEs are being dispersed on roadsides, and as far as 55 meters from the roads.

Platinum is highly allergenic and consistent exposure to it at even low levels can lead to asthma, sensitive skin or other symptoms. More research needs to be done on the harmful effects of palladium and rhodium.

The researchers also note that PGE dispersion could lead to other problems since many U.S. roads run through agricultural areas. It is not known as yet if the elements are entering groundwater supplies or the wildlife or human food chains.

The team also indicated that there is the potential for even higher levels of PGE emissions because the Clean Air Act of 1990 requires catalytic converters to be attached to small gas engines such as those on lawn mowers and chain saws.

CEST is a cooperative effort between Notre Dame's Colleges of Science and Engineering, providing education and basic research opportunities for the development of cutting-edge technologies leading to innovative solutions to both national and international problems.

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PGE accumulation add 2

The Notre Dame researchers included Clive R. Neal, associate professor of civil engineering and geological sciences and director of the Inductively Couple Plasma-Mass Spectrometry (ICP-MS) research facility; Charles F. Kulpa Jr., professor of biological sciences and director of CEST; Jinesh Jain, manager of the ICP-MS; James C. Ely, a postdoctoral student; and James C. Seidler, an undergraduate student. Mark A. Schneegurt, an assistant professor of biological sciences at Wichita State University, who was a postdoctoral research associate and research assistant professor in Notre Dame's Department of Biological Sciences from 1996 to 2000, also participated in the research.

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