

# Study finds increasing atmospheric concentrations of new flame retardants

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Compounds used in new flame-retardant products are showing up in the environment at increasing concentrations, according to a recent study by researchers at Indiana University Bloomington.

The study, published in the journal [Environmental Science & Technology](#), reports on concentrations of two compounds measured in atmospheric samples collected in the [Great Lakes](#) region between 2008 and 2010. Authors are doctoral student Yuning Ma, Assistant Research Scientist Marta Venier and Distinguished Professor Ronald A. Hites, all of the IU School of Public and Environmental Affairs.

The chemicals -- 2-ethylhexyl tetrabromobenzoate, also known as TBB; and bis(2-ethylhexyl) tetrabromophthalate, or TBPH -- are used to reduce flammability in such products as electronic devices, textiles, plastics, coatings and polyurethane foams.

They are included in commercial mixtures that were introduced in recent years to replace polybrominated diphenylethers (PBDEs), widely used flame retardants that have been or are being removed from the market because of their tendency to leak from products into the environment.

"We find that the environmental concentrations of these compounds are increasing rather rapidly," Hites said. "It's rare to find that concentrations of any compound are doubling within a year or two, which is what we're seeing with TBB and TBPH."

The researchers measured concentrations of TBB and TBPH in 507 air samples collected at six locations on the shores of the Great Lakes. The samples were collected by the Integrated Atmospheric Deposition Network, a joint U.S.-Canada project, conducted by IU researchers, to monitor airborne toxic chemicals that are deposited in the Great Lakes.

The results constitute the first self-consistent data set that shows environmental concentrations of TBB and TBPH increasing relatively rapidly. Previous studies have found the compounds in sewage sludge in California, marine mammals in Hong Kong and household dust and furniture foam in the U.S.

As would be expected, the IU researchers found the largest concentrations of TBB and TBPH in atmospheric samples collected in urban areas: Chicago and, especially, Cleveland. But the [compounds](#) were also detected in about half the samples from remote sites at Sleeping Bear Dunes and Eagle Harbor in Michigan and Point Petre in Ontario, Canada. They also were detected at rural Sturgeon Point, N.Y.

TBPH was detected more frequently and in higher concentrations than TBB. The concentrations are similar to those reported previously by Hites and Venier for PBDEs at the Great Lakes sites, suggesting the newer-generation [flame retardants](#) may be replacing their predecessors in the environment.

Provided by Indiana University

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