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## **Plastic substitutes and other breakthroughs from 25 years of green chemistry**

*Source: [The Guardian, October 6, 2016](#)*

*Author: Bruce Watson*

This year, green chemistry celebrates its 25th birthday. The science of finding more sustainable and less toxic chemicals was once a revolutionary idea, but has since become a part of the consumer product landscape. From removing carcinogens from furniture to banning ineffective antibacterial chemicals, the struggle to create a healthier and more sustainable chemical landscape continues to attract widespread attention.

Customers -- and companies -- are taking note. A recent survey estimates that the global market for green chemicals is on track to grow from \$11bn in 2015 to \$100bn in 2020. In North America, the numbers are expected to go from \$3bn to \$20bn in the same period.

As green chemistry prepares to enter its next quarter century, we asked some pioneers in the field to tell us about some of its most important advancements.

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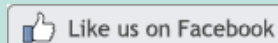
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## **EPA Acts on New Chemical Law to Fast-Track Five Chemicals**

*Source: [U.S. Environmental Protection Agency, October 11, 2016](#)*

WASHINGTON -- EPA is taking swift steps to carry out requirements in the Frank R. Lautenberg Chemical Safety for the 21st Century Act to reform the Toxic Substances Control Act and to reduce exposure to certain persistent, bioaccumulative, and toxic (PBT) chemicals.

"The threats from persistent, bioaccumulative and toxic chemicals are well-documented," said Jim Jones, assistant administrator in EPA's office of chemical safety and pollution prevention. "The new law directs us to expedite action to reduce risks for these chemicals, rather than spending more time evaluating them. We are working to ensure the Frank R. Lautenberg Chemical Safety Act signed in June of this year delivers on the promise of better protecting the environment and public health as quickly as possible."

The five chemicals to receive expedited action are:

- Decabromodiphenyl ethers (DecaBDE), used as a flame retardant in textiles, plastics and polyurethane foam;
- Hexachlorobutadiene (HCB), used in the manufacture of rubber compounds and lubricants and as a solvent;
- Pentachloro-*o*-phenol (PCTP), used as an agent to make rubber more pliable in industrial uses;
- Tris (4-isopropylphenyl) phosphate, used as a flame retardant in consumer products and other industrial uses; and
- 2,4,6-Tris(tert-butyl)phenol, used as a fuel, oil, gasoline or lubricant additive.

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## CMR substances not automatically banned in cosmetics

[Source: Chemical Watch, October 6, 2016](#)

[Author: Vanessa Zainzinger](#)

Carcinogenic, mutagenic or reprotoxic (CMR) substances are not automatically banned for their use in cosmetic products, if they have a mandatory classification as such under the CLP (Classification, Labeling and Packaging) Regulation.

The European Commission confirmed this at September's meeting of its cosmetics working group. ...

This says in general, category 1 and 2 CMR substances are prohibited for use in cosmetics. However, there are exemptions. Category 2 CMRs can be used if deemed safe by the European Commission's Scientific Committee for Consumer Safety (SCCS). Category 1 CMRs can be used if the SCCS decides it would be safe, and if three other criteria set out in the Article are also met.

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## New Report from Senator Markey Details Widespread Presence of Toxic Chemicals in Nation's Schools

[Source: U.S. Senator Ed Markey's Office, October 5, 2016](#)

Washington (October 5, 2016) -- Up to 14 million students nationwide, representing nearly 30 percent of America's school-aged population may be exposed to toxic chemicals called PCBs in their schools. That's just one finding from Senator Edward J. Markey's (D-Mass.) new report, "The ABC's of PCBs: A Toxic Threat to America's Schools", which details the presence of polychlorinated biphenyls (PCBs), a class of man-made chemicals linked to cancer and other health problems, that are found in school building materials and equipment across the country. The report details how

children in schools across the country may be unknowingly exposed to PCBs, that there are generally no requirements for schools to do testing or inspections to ensure PCB exposures aren't happening, and that even when exposure is identified, reporting and remediation of PCB hazards are inconsistent and often ineffective. The report includes case studies from California, Massachusetts and New York on school districts that have identified PCB hazards in local schools.

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See the full report, "[The ABCs of PCBs: A Toxic Threat to America's Schools](#)".

## **Duty to prevent childhood exposure**

[Source: UN Special Rapporteur On Human Rights & Toxics, September 15, 2016](#)

[Author: Baskut Tuncak](#)

The best interests of the child should be at the heart of decision making when it comes to protecting children's rights to life, survival and development, health, freedom from the worst forms of child labour, and also to safe food, water and housing. The UN Convention on the Rights of the Child explicitly links children's right to health with pollution and contamination, but there are still systemic failures to realizing children's rights in the context of toxic chemicals.

Childhood exposure to toxic substances in every part of the world has created a "silent pandemic" of disease and disability affecting millions of children and adults. Rates of disease and disability linked to childhood exposure to toxic chemicals have increased around the world at rates that can not be explained by genetics or lifestyle choices, leaving toxic chemicals and pollution as a major contributing factor. Recent cases have called into question how effectively States are protecting human rights when it comes to toxics, and children's rights are arguably the most at risk. The World Health Organisation estimates that more than 1,700,000 children under the age of five died prematurely from modifiable environmental factors; but these figures are only the tip of the iceberg when it comes to death, disease and disability linked to toxics and pollution.

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See the "[Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes](#)".

Also see, "[Former Samsung worker's death from cancer at 22 kicked off campaign](#)".

## **Development of a Waterborne, Zero-VOC DTM (direct-to-metal) with Excellent Corrosion Resistance**

[Source: Paint & Coatings Industry, October 1, 2016](#)

[Authors: Richard Flecksteiner, Terri John, and Cassandra Giorgio](#)

A well-formed hydrophobic film that is impervious to water and salts is required to prevent corrosion of painted metal surfaces. One of the most effective ways to ensure that the film is well formed is through the use of coalescing solvents. The ability of a coating to form a protective film becomes more difficult as the amount of coalescent in the coating formulation decreases. At the same time, coatings manufacturers are interested in reducing the amount of volatile organic compounds (VOCs) in their coatings. This trend is driven both by regulation as well as consumer preference.

One way to reduce the amount of coalescent in the coatings is to reduce the minimum film formation temperature (MFFT) of the polymer. The most obvious way to accomplish

this is to reduce the glass transition temperature ( $T_g$ ) of the polymer. Unfortunately, this will also reduce the hardness and dirt pickup resistance of the coatings. Through the use of designed particle morphology and process conditions we have developed a latex that can be formulated into a coating without the use of coalescing solvents that gives excellent corrosion resistance, adhesion to steel, and still is hard enough to give good block resistance and dirt pickup resistance.

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## Want sharper workers? Try a green-certified office

Source: [GreenBiz.com, October 7, 2016](#)

Author: Elsa Wenzel

LOS ANGELES -- Can a green building make your company smarter? That's what new research suggests, underscoring the ROI for green certifications -- not just for optimizing the usual factors like energy and water use, but for elevating workforce productivity.

It's clear at Greenbuild 2016 this week that the health and wellness of workers indoors is becoming a high-level concern. No longer is human comfort something a corporation might consider from the kindness of its profit-seeking heart. Instead, evidence of a competitive advantage for fostering well-being speaks the language of the C-suite.

The early results of a new study dubbed COGFX are being buzzed about for finding 26-percent higher scores on cognitive tests for workers in LEED-certified buildings.

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## Phthalates in Fast Food: A Potential Dietary Source of Exposure

Source: [Environmental Health Perspectives, October 2016](#)

Author: Wendee Nicole

Many research studies have surveyed nutritional habits, but fewer have studied how food processing and packaging might introduce unwanted chemicals into foods. In this issue of *EHP*, researchers report that fast food consumption appears to be one source of exposure to the chemicals di(2-ethylhexyl) phthalate (DEHP) and diisononyl phthalate (DiNP).

The authors used data from the National Health and Nutrition Examination Survey (NHANES) to estimate the percentage of individuals' calories that came from fast food, fat intake attributable to fast food consumption, and fast food intake by food group. During NHANES interviews, respondents had reported their diet from the preceding 24 hours. Fast food was defined as food obtained from restaurants without waiter service and from pizza restaurants, as well as all carryout and delivery food. Regression analyses were used to determine associations between fast food consumption and urinary concentrations of DEHP metabolites, DiNP metabolites, and bisphenol A (BPA).

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Also see from *EHP*, "[Recent Fast Food Consumption and Bisphenol A and Phthalates Exposures among the U.S. Population in NHANES, 2003-2010](#)", and "[Toward a Better Beauty Regimen: Reducing Potential EDC Exposures from Personal Care Products](#)".

## Surface degradation and nanoparticle release of a commercial nanosilica/polyurethane coating under UV exposure

Source: *Journal of Coatings and Technology Research*, September 2016

Authors: Deborah S. Jacobs, Sin-Ru Huang, Yu-Lun Cheng, Savelas A. Rabb, Justin M. Gorham, Peter J. Krommenhoek, Lee L. Yu, Tinh Nguyen, Lipiin Sung

Many coating properties such as mechanical, electrical, and ultraviolet (UV) resistance are greatly enhanced by the addition of nanoparticles, which can potentially increase the use of nanocoatings for many outdoor applications. However, because polymers used in all coatings are susceptible to degradation by weathering, nanoparticles in a coating may be brought to the surface and released into the environment during the life cycle of a nanocoating. Therefore, the goal of this study is to investigate the process and mechanism of surface degradation and potential particle release from a commercial nanosilica/polyurethane coating under accelerated UV exposure. Recent research at the National Institute of Standards and Technology (NIST) has shown that the matrix in an epoxy nanocomposite undergoes photodegradation during exposure to UV radiation, resulting in surface accumulation of nanoparticles and subsequent release from the composite. ...

The results demonstrated that the added silica nanoparticle solution decreased the photodegradation rate (i.e., stabilization) of the commercial PU nanocoating. Although the degradation was slower than the previous nanosilica epoxy model system, the degradation of the PU matrix resulted in accumulation of silica nanoparticles on the nanocoating surface and release to the environment by simulated rain. These experimental data are valuable for developing models to predict the long-term release of nanosilica from commercial PU nanocoatings used outdoors and, therefore, are essential for assessing the health and environmental risks during the service life of exterior PU nanocoatings.

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