

Greenlist Bulletin

From the Toxics Use Reduction Institute
at the University of Massachusetts Lowell

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This is the bi-weekly bulletin of the TURI Library at the University of Massachusetts Lowell. Greenlist Bulletin provides previews of recent publications and websites relevant to reducing the use of toxic chemicals by industries, businesses, communities, individuals and government. You are welcome to send a message to mary@turi.org if you would like more information on any of the articles listed here, or if this email is not displaying properly.



Hex Chromium-Free Sealants for Defense and Aerospace

[Source: *Products Finishing*, August 1, 2014](#)

Authors: Dayna Lamb, Gregory Morose, and Kent DeFranco

Polysulfide sealants containing soluble hexavalent chromium compounds are used in aerospace/defense manufacturing primarily for the filling of gaps and recesses to prevent water intrusion in an attempt to prevent corrosion of the base metal. Regulatory mandates have accelerated a global effort industry wide to replace hexavalent chromium containing materials because they are carcinogens, mutagens, developmental toxicants, and have high acute toxicity. The principal technical performance challenge for transitioning to hexavalent chromium free polysulfide sealants is twofold; the corrosion inhibiting properties of the hexavalent chromium free alternatives are not well understood, and the industry and military standards' qualification tests do not adequately differentiate between hexavalent chromium containing and hexavalent chromium free formulations.

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TURI's Note: This article summarizes the collaborative Phase II research conducted by TURI's Defense and Aerospace Supply Chain workgroup; for more information, contact [Greg Morose](#).

Also find additional information on our webpage, [Aerospace/Defense Industry Collaborative Research](#). Also, see our recently published fact sheet on [hexavalent chromium](#).

Styrene Reasonably Anticipated to Be a Human Carcinogen, New Report Confirms

[Source: National Academy of Sciences, July 31, 2014](#)

A new report from the National Research Council has upheld the listing of styrene as "reasonably anticipated to be a human carcinogen" in the National Toxicology Program's 12th Report on Carcinogens (RoC). The committee that wrote the report found that the listing is supported by "limited but credible" evidence of carcinogenicity in human studies, "sufficient" evidence from animal studies, and "convincing relevant information" in mechanistic studies that observed DNA damage in human cells that had been exposed to styrene. The committee reached the same conclusion after conducting both a peer review of the RoC and an independent assessment of the styrene literature.

The NTP is an interagency program that produces the RoC. Styrene is a substance of interest for the RoC because many people in the United States are exposed. It is an oily, colorless to yellow liquid and it is found in many consumer products such as plastic packaging, food containers, and household goods. Sources of environmental exposure include cigarette smoke and vehicle exhaust. Occupational exposure can occur during the industrial processing of styrene.

[Read more...](#)

Access the "[Review of the Styrene Assessment in the National Toxicology Program 12th Report on Carcinogens](#)".

Evaluation of Occupational Exposures at an Electronic Scrap Recycling Facility

[Source: National Institute for Occupational Safety and Health \(NIOSH\) Health Hazard Evaluation Program, July 2014](#)

Authors: Diana Ceballos, Lilia Chen, Elena Page, Alan Echt, Aalok Oza, and Jessica Ramsey

This NIOSH report (Report No. 2012-0100-3217) describes assessment of an electronic scrap recycling facility in March, July, and November 2012 and January and February 2013, at the request of the facility's health and safety manager. NIOSH evaluated air, surfaces, blood, and urine for metals, as well as noise exposures. They found overexposures to lead, cadmium, and noise. Some employees had blood lead levels above 10 micrograms/dl. The report includes recommendations provided to prevent these exposures to employees, and to prevent unintentionally taking metals home to family members.

Access report [here](#).

Also see from the NIOSH Health Hazard Evaluation Program, "[A Pilot Assessment of Occupational Health Hazards in the U.S. Electronic Scrap Recycling Industry](#)."

See from Toxics Link, New Delhi, India, "[Impact of E-Waste Recycling on Water and Soil](#)".

TURI's Note: Thanks to Joy Scrogum from Sustainable Electronics Initiative (SEI) at the Illinois Sustainable Technology Center (ISTC) for writing the summary comments on the report included above. See the [SEI home page](#) for additional information on E-waste.

New England Companies Implement Oil Spill Prevention Measures

[Source: Environmental Leader, July 29, 2014](#)

Seven companies in New England that store and distribute oil have all created or updated spill prevention plans, come into compliance with federal oil pollution prevention laws, and paid fines ranging from \$3,000 to \$9,500, according to the EPA.

The EPA has been particularly vigilant in recent years regarding possible oil spills near water, regardless if the spill comes from a pipeline, a boat, by rail, or some other source.

The companies, located in Massachusetts, Maine, Connecticut and Vermont, agreed to pay the penalties under an EPA expedited settlement program. As part of the program, the agency agrees to

resolve the cases for reduced penalties with companies that are able to quickly correct violations of the Oil Pollution Prevention regulations, have certain minimum storage capacity and do not have an accompanying spill.

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Also read from *Environmental Leader*, "[Top Environmental Management Practices Revealed](#)".

'Green' buildings appear to boost health of low-income residents

[Source: Harvard School of Public Health, 2014](#)

Residents of low-income housing appear to get a boost in health from living in "green" buildings that are built with eco-friendly materials and energy-efficient features, according to a Harvard School of Public Health (HSPH) study.

The researchers, led by Meryl Colton of HSPH's Department of Environmental Health in collaboration with the Boston Housing Authority (BHA), surveyed the health of people living in public housing units before and after they moved from conventional apartments into "green" ones. The researchers also did environmental sampling and home inspections. They found that improved ventilation and pest management systems in the green apartments appeared to boost indoor air quality and also lessened "sick building syndrome" symptoms such as headaches and itchy or burning eyes.

[Read more...](#)

See original study in *Environmental Science & Technology*, "[Indoor Air Quality in Green vs. Conventional Multifamily Low-Income Housing](#)".

Also see from the *Journal of Cleaner Production*, "[Environmental impacts of natural and conventional building materials: a case study on earth plasters](#)".

Dyeing properties and color fastness of cellulase-treated flax fabric with extractives from chestnut shell

[Source: Journal of Cleaner Production, October 1, 2014](#)

Authors: Qi Zhao, Hao Feng, Lijuan Wang

Flax fabric was pretreated with acid cellulase and then dyed with a natural dye extracted from chestnut shell (EFCS). Suitable conditions were selected for the enzymatic treatment of flax fabric. The dyeing property of pretreated flax textiles during dyeing with EFCS was determined by dyeing experiments through the control variate method. UV-vis absorption spectra of EFCS were recorded to calculate the dye uptake. The colorimetric parameters L^* , a^* , b^* , ΔE , and color strength of samples were measured to select the optimal dyeing conditions. Finally, the fabric was dyed with metal-salt mordant after enzymatic treatment under the optimal treatment condition. The color fastness to washing, rubbing of the dyed samples was determined according to AATCC test methods, whereas the color fastness to light was tested according to the ISO standard. Optimum dyeing results were achieved when dyeing with 16 g/L of EFCS solution at 95 °C for 50 min and at pH 4. The contrast of colorimetric parameters of treated fabric and untreated fabrics indicate that enzymatic treatment improved the softness of flax fabric and slightly enhanced the dyeing behavior of flax during dyeing with EFCS in that the K/S value increased around 15%. Flax fabric dyed without mordant had a shade of yellowish-brown, while the mordanted ones exhibited a variety of pale to dark shades. The overall color fastness of dyed samples showed good level except for fabric mordanted with ferrous sulfate. EFCS dyeing combined with enzymatic treatment is an ecological and promising approach for textile industry.

[Read more...](#)

Also see from the *Journal of Cleaner Production*, "[Natural dye extracted from Chinese gall -- the application of color and antibacterial activity to wool fabric.](#)"

Insecticides in our food and water, new studies find

[Source: Pioneer Press, July 25, 2014](#)

Author: Dave Orrick

Nicotine-related insecticides widely used on crops are finding their way into the food we eat and the

water we drink, two national studies published in the past two months have concluded.

A study released this week by the U.S. Geological Survey found neonicotinoids -- a relatively new family of insect-killing chemicals exploding in use in the Farm Belt and a leading suspect in the collapse of bee populations -- in nine Midwestern rivers, including the Mississippi and Missouri.

Last month, a study by the Harvard School of Public Health found "neonics" in fruits, vegetables and honey purchased from grocery stores.

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See article in the *Journal of Agricultural and Food Chemistry*, "[Quantitative Analysis of Neonicotinoid Insecticide Residues in Foods: Implication for Dietary Exposure](#)".

View article in *Environmental Pollution*, "[Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA](#)".

Also see from Harvard School of Public Health, "[Study strengthens link between neonicotinoids and collapse of honey bee colonies](#)".

EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement

[Source: Government Accountability Office, July 28, 2014](#)

Every day in the United States, at least 2 billion gallons of fluids are injected into over 172,000 wells to enhance oil and gas production, or to dispose of fluids brought to the surface during the extraction of oil and gas resources. These wells are subject to regulation to protect drinking water sources under EPA's UIC class II program and approved state class II programs. Because much of the population relies on underground sources for drinking water, these wells have raised concerns about the safety of the nation's drinking water.

GAO was asked to review EPA's oversight of the class II program. This report examines (1) EPA and state roles, responsibilities, and resources for the program, (2) safeguards to protect drinking water, (3) EPA oversight and enforcement of class II programs, and (4) the reliability of program data for reporting. GAO reviewed federal and state laws and regulations. GAO interviewed EPA and state officials and reviewed class II programs from a nongeneralizable sample of eight states selected on the basis of shale oil and gas regions and the highest number of class II wells.

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View report [here](#).

Study of the Curing Kinetics of Epoxy Resins with Biobased Hardener and Epoxidized Soybean Oil

[Source: ACS Sustainable Chemistry and Engineering, July 8, 2014](#)

Authors: Ghodsieh Mashouf Roudsari, Amar K. Mohanty, and Manjusri Misra

The goal of this research was to study the kinetics of the reaction of diglycidyl ether of bisphenol A (DGEBA)-based epoxy resin cured with sebacic acid as a biobased hardener in the presence of three different loadings of epoxidized soybean oil (ESO) (i.e., 10, 20, 30 wt %). Nonisothermal differential scanning calorimetric (DSC) and model-free isoconversional method was used to analyze the curing kinetic data and determine the activation energy of the reactions. It was found that the biobased hardener increased the enthalpy of reaction as well as the activation energy of reaction in comparison to the amine hardeners that are currently used for epoxy curing. The addition of epoxidized soybean oil increased the enthalpy of reaction, maximum exothermic temperature, and activation energy of the system. Kissinger-Akahira-Sunose (KAS) and Starink methods were used to determine the activation energy of the studied systems. It was also found that the curing reaction of epoxy with 30 wt % of ESO is diffusion controlled in comparison with other counterparts.

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Four Massachusetts Companies Win EPA Funding for Sustainable and Innovative Products and Research

[Source: U.S. Environmental Protection Agency, July 28, 2014](#)

BOSTON -- Four Massachusetts companies are among 21 small businesses nationwide selected by EPA to receive approximately \$100,000 each to develop technologies that will help the environment and public health. The four Mass. companies are Aspen Products Group of Marlborough, EnChem Engineering, Inc. of Newton, Reactive Innovations of Westford, and UltraCell Insulation of Newtonville. ...

Reactive Innovations of Westford received \$99,999 to develop a greener way to produce dimethyl carbonate, an environmentally benign solvent used in manufacturing products ranging from batteries to plastics. With most production occurring in China, and a significant shortage of U.S. manufacturers, production methods have historically involved toxic and hazardous reagents while consuming large amounts of energy. The method being developed by Reactive Innovations will not only allow for US manufacturing, but will do so using an efficient reactor that minimizes energy and waste streams. Reactive is developing an electrochemical synthesis method that reacts carbon dioxide and methanol feedstocks using an ionic liquid electrolyte medium to generate the solvent. This reaction process is being applied in Reactive's micro-channel electrochemical reactor that enables high production levels to be obtained continuously unlike present electrochemical methods.

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