Nike's Chemistry Center of Excellence: Innovating the Chemical Supply Chain

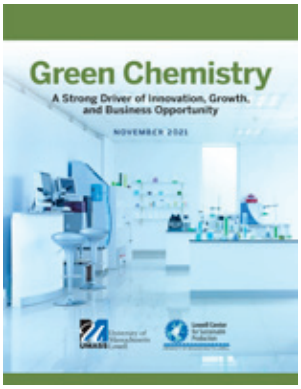
The Nike Chemistry Center of Excellence (COE) is part of Nike's overall global sustainability team and is focused on coordinating sustainable chemistry across the business to drive the scaling of green chemistry. Day to day, the team spends a lot of time coordinating with key partners throughout Nike on the phase out of PFC's, dimethyl formamide (DMFa), and other priority chemicals from the supply chain. A core principle of the priority chemistry work is to avoid "regrettable substitutions" by replacing one hazardous chemical with another hazardous chemical. The COE utilizes their chemistry assessment process which is a hazard-based screening process that helps to understand the impact of chemistries being used in the supply chain.

QUICK FACTS

- Nike, Inc. was founded in 1965
- World's largest supplier of athletic shoes and apparel
- Based in Beaverton, Oregon
- Over 76,000 employees and revenues exceeding $37.4B
- Has over 1,100 retail stores around the globe

There are many examples of how Nike is working to render their products more environmentally friendly as a function of green chemistry initiatives. For instance, the U.S. EPA's 2010/2015 PFOA Stewardship Program focused on reducing long chain (i.e., C8 or greater) perfluorinated chemicals (PFCs) and PFOA emissions, since existing data shows that shorter chain compounds have a lower potential for toxicity and bioaccumulation. Nike began moving away from C8 PFC's in their water-resistant products and switched to C6 chemicals to provide water repellency. After spending a lot of time moving from C8's to C6's, the regulatory landscape began to shift, and the team realized that in the short to near term, PFC's as a class of chemicals were not favorable. This led the team to begin pursuing the complete elimination of fluorinated chemistries from all water-resistant treatments. As Nike's moved out of fluorinated chemicals, they used their chemistry assessment process to not only move out of PFCs but to use materials that were substantially better from a sustainability perspective.

Driving the adoption of green and sustainable chemistry requires ongoing research and study. Every new material or chemistry introduced at Nike must



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https://greenchemistryandcommerce.com/publications

go through chemistry assessment which includes a toxicology review and a regulatory assessment review. This process yields a list of approved products, which has become the rule. Any new product which is not on this approved list cannot be used in any product within Nike's supply chain. This is a very high bar. The chemistry assessment methodology has been shared with other brands in the sector. For instance, Nike is collaborating with other companies such as Levi Strauss & Co., H&M, and C&A as part of the Zero Discharge of Hazardous Material foundation to create an aligned chemical screening tool.[1] This type of innovation and inter-brand collaboration is essential to moving towards a common goal of zero discharge of hazardous chemicals.

Compliance with government regulations on restricted substances is a foundational aspect to Nike's culture. Most major footwear and apparel brands meet and often exceed the guidelines provided by industry tools such as the AFIRM Restricted Substance Lists (RSL)[2] and ZDCH Manufacturing Restricted Substance List (MRSL).[3] Nike affirms publicly their conformance to these requirements. However, compliance is just the baseline, foundational expectation. Nike works on going "beyond compliance" and actively invests in research that can keep up with the changing regulatory landscape. The EU was clearly ahead in setting chemical and sustainability related regulations, and this became the yardstick for many of Nike's beyond compliance processes that have been put in place. Global regulation became the driver, and there was an increasing recognition that Nike could reduce their overall chemical footprint in all areas of business, whether it is wastewater impacts or the overall impact to all people on the planet.

One ongoing public relations challenge Nike faces is that chemistry is difficult to talk to consumers about. It became difficult for Nike to publicly state that they are not using a particular hazardous chemical, unless they were absolutely sure that no one in the supply chain was using it. The phase out work of the Center is not often publicly discussed, but the group has become much more open recently about its goal for 2025. Like many other companies, the goal is to eventually eliminate all hazardous materials from the supply chain, and there is an expectation that this will occur. The roadmap to achieving that vision of "Zero Discharge of Hazardous Chemicals" is still evolving. Two of the biggest challenges to knowing how to achieve that vision are 1) lack of full information about where, how, and what chemicals are used continues to be an ongoing challenge; and 2) unavailability of better, more sustainable choices.

For example, dimethyl formamide (DMFa) is on Nike's RSL, but it is still used in isolated parts of the supply chain. The team is actively looking for an alternative to DMFa that is inherently better and will still meet the performance requirement demanded by customers. The team has put a call out to the chemical industry to announce that they are looking for a greener alternative, and that they are willing to work in partnership on a more sustainable replacement. However, finding the right chemical is like finding the golden goose for certain types of chemistries.

1 https://sourcingjournal.com/topics/raw-materials/zdhc-brands-screened-chemistry-programs-135075
2 https://www.afirm-group.com/afirm-rsl
3 https://mrsl.roadmaptozero.com

CASE STUDIES

In some cases, alternative chemistries are available, but at a higher cost. In such cases, Nike can leverage its buying power to render it as economically efficient as possible. For instance, in the area of synthetic leather, the DMF phase out will be a transition as part of a larger material consolidation. This is an important step in moving Nike closer to their target. The phase out took an enormous amount of work with the procurement and material teams, a lot of convincing, and a bit of a leap of faith. Everyone got on board once it became clear that sustainability was the common enterprise-wide goal that drove the hard work and the heavy lift.

Nike is also evaluating biobased materials and exploring some products that are incorporating these elements. One of the challenges identified is that biobased materials are not always better from a life cycle perspective, particularly when one begins to look at energy use and feedstocks. The full impacts of biobased materials and their life cycle carbon footprint, as well as the short-term and long-term tradeoffs, is an area of future growth and research but will begin by ensuring that "the right questions" are being asked.

This challenge of measurement extends to other areas as well. One current area of emphasis is on "greening" the use of organic solvents and moving to more water-based solvents. But there may be limits in transitioning to water-based as water-based increases energy use, since it can lead to longer drying times. So, there is a question of whether the chemistry-based benefits aren't overshadowed by the increase in energy use. Nike has made commitments on all three fronts: energy, water, and chemistry, and sometimes the choices involve trade-offs between these three commitments, making the decision more complicated. For instance, not using a specific chemical can have a knock-on impact on water use, and not using a particular chemistry can result in more energy required to produce the final material or product.

These types of tradeoffs are very complicated—particularly for a company that produces more than a billion shoes in factories around the world producing thousands of products. However, the more information that is gathered over time, the better the choices are going to be. The field of green chemistry will no doubt continue to grow, due to increasing regulation, emerging taxes on certain classes of chemical use in the EU, and very soon, the signals from European Union that will focus on a sustainable and circular economy that is driving the use of recycled material. These elements will continue to escalate and will continue to drive innovation in green chemistry at Nike and others in the footwear and apparel industry.