What the U.S.Needs to Stayat the Top

Perkin Medal recipient Dr. James Stevens discusses the future of the chemical industry and what it must do to succeed

Dr. James Stevens, research fellow with Dow By Joy LePree Established in 1906, the Perkin Medal is considered one of the chemical industry's most prestigious awards and the highest honor that the Society of Chemical Industry bestows on an individual for outstanding work in applied chemistry in the U.S. The award commemorates the discovery of the first synthetic dye by Sir William Henry Perkin in 1856, which secured organic chemistry's place as a major segment of the chemical industry. Dr. James Stevens, research fellow with the Dow Company's Performance Plastics and Chemicals R&D division, was the recipient of the 100th Perkin Medal for his work in plastics innovation. He joined Dow Central Research and began work in the catalyst field in the late 1970s. Dr. Stevens has been involved with the discovery and commercial implementation of Dow's Insite technology and constrained-geometry catalysts, which are used in the production of approximately 2 billion pounds of polyolefins per year. He is one of the primary inventors of a number of commercial catalysts and plastic products including a variety of Insite catalysts. His work has resulted in several new Dow products including Affinity polyolefin plastomers, Elite enhanced polyethylene resins, Engage polyolefin elastomers, Nordel IP EPDM rubber, Nordel MG EPDM, Index interpolymers, and Versify plastomers and elastomers. His current work includes applications of combinatorial and high-throughput methods to catalyst research, solution-process polypropylene, and the relationship of catalyst structure to polymer microstructure. Based on his tenure, experience, and success in plastics, CHEM.INFO asked Dr. Stevens to share his thoughts about several chemical industry issues. **Q:** What does the future of the chemical industry hold and what part might your work play in it? **A:** We are at a point in time where I've never been more excited about the potential of the things I see going on, but at the same time I've never been more concerned. Globally and in the U.S., we are being impacted by issues like global warming and energy use. We know we can't continue to dig fossil carbon out of the ground and put it into the atmosphere because it's causing problems for our climate. So, we need to do alternative things. I can see clear paths that we can take using new chemistry, new developments, and new technologies in catalysis to make greener fuels and put solar cells on everyone's roof in a cost-effective way to generate electricity in everyone's home and turn biomass into fuels and chemicals. We are talking about taking Brazilian ethanol, which comes from carbon dioxide taken out of the air by green plants and sunlight and making bioethanol and turning it into ethylene. Ethylene can be turned into just about anything with the right catalyst. We can make polyethylene, which is normally not considered a green polymer, in this way and make it a green polymer since the carbon comes from carbon dioxide in the air. The possibilities here are huge, given the will, the trend, and the time. **Q:** How do we go about making these types of things happen? **A:** It is going to require sophisticated chemistry. Right now we have

the tools, but one of the major hurdles is finding the right people with the right background to use them. **Q:** Any suggestions on finding and developing these people? **A:** It used to be that the U.S. had the best R&D schools and the brightest foreign students came over here and learned all this great stuff. A lot of those students stayed here and contributed to the growth and betterment of the U.S. Now many of them are going home to their native countries such as Japan and India where there's a lot of opportunity. This is an issue we need to address, but it's a difficult one. I lecture at chemistry colleges and a lot of professors say they can't get funding. The government is pouring money into foreign policy and defense and not into training and R&D at the university level. We need to make it known how important funding for these programs is because the world's future depends on maintaining an edge in technology and developing innovative solutions as problems come up. Smart people with the right tools can always figure a way out of a problem, but if we don't have people with the right background, training, and motivation, then it's going to be a disaster. **Q:** What other areas need to be improved to strengthen the industry? **A:** If U.S. industry wants to remain a leader in chemistry, the need to stay innovative is crucial. For example, 10 years ago Dow made 0.0 pounds of EDPM rubber. The way it was traditionally made used a huge amount of energy and a toxic catalyst and resulted in contaminated water that had to be treated. At Dow, we invented a new catalyst and process that were thousands of times more reactive than the existing one, didn't generate wastewater, and used one-third of the energy. Now Dow is the world leader in EDPM. It shows that if you're a chemical manufacturer using old technology with poor energy efficiency that generates a lot of waste and someone comes along with a better solution using innovation and catalysis, you could be blown away. Whether you're talking about a small company or a national industry, the need to develop new technologies is imperative. **Q:** How does it feel to win the Perkin Medal, one of the industry's highest honors? **A:** Henry Perkin ... launched the chemical industry as we know it today. Before he came along it was really just a bunch of alchemists with boiling pots. After his discovery, people woke up and noticed they could actually make valuable chemicals. And with that realization came the birth of the modern chemical industry. So for me, receiving the Perkin Medal was a really, really cool thing. *Joy LePree is a contributing writer for CHEM.INFO. She has worked as a journalist for 14 years, covering a variety of issues and trends involving chemicals, processing, engineering, and maintenance*

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