William Trogler and a team of chemists report new method for making primary alcohols

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UCSD CHEMISTS REPORT NEW METHOD FOR MAKING PRIMARY ALCOHOLS

A team of chemists at the University of California, San Diego have reported the development of an inexpensive, one-step procedure for making the primary alcohols that are essential to manufacturing biodegradeable detergents.

The new method "could be an inexpensive route to an important class of industrially useful alcohols," according to William C. Trogler, UCSD professor of chemistry, and Craig M. Jensen, a former research chemist at UCSD and now a professor of chemistry at the University of Hawaii. They describe the process in the September 5 issue of Science magazine.

Manufacturers and consumers of detergents and plastics stand to benefit from the efficient and inexpensive new process. The procedure is also a candidate for use in the synthesis of specialty chemicals and drugs.

The method is based on the catalytic conversion of an abundant group of organic compounds called olefins, or alkenes, which are found in oil and other petrochemicals. Using a compound of platinum, hydrogen and phosphorus as catalyst, the scientists successfully produced primary alcohols by hydrating the olefins. Put simply, hydration is the injection of water.

"It's the first time anyone has seen a direct method for hydrating olefins to primary alcohols. Chemists have been trying to do this for a long time," Trogler said in an interview.

Until now, there have been two main methods for making primary alcohols. One is a laborious and costly non-catalytic reaction using aluminum complexes that calls for extreme conditions such as high pressure and high temperatures. The other is a complex two-step catalytic process called hydroformylation.

Their research "establishes the feasibility of direct catalytic hydration of terminal alkenes to primary alcohols and suggests a mechanism that will aid in the design of catalyst systems for an important class of chemicals," Trogler and Jensen said in their published article.

Trogler, who is collaborating with a major chemical company to adapt the process, says it has the potential of becoming "a significant industrial process" within the next five to ten years. The University of California has a patent pending on the procedure.

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