Progress in using ethanol to make key raw material now produced from oil

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Ethanol from corn and other plants could become the sustainable, raw material for a huge variety of products, from plastic packaging to detergents to synthetic rubber, that are currently petroleum-based. This was the conclusion of an article published in the ACS journal *Industrial & Engineering Chemistry Research*.

Yingzhe Yu and colleagues point out that a chemical called ethylene, now produced from petroleum, is one of the most important raw materials for everyday products. Ethylene is used to make hundreds of products, including polyethylene, the world's most widely used plastic. Scientists have been seeking sustainable alternatives to petroleum for making ethylene, and Yu's team reviewed progress in the field.

They found that one particular device has the potential to make a highly pure ethylene product from ethanol with high efficiency and low cost. The device, called a fluidized bed reactor, works by suspending the chemicals needed to make ethylene inside the walls of a chamber. Newly produced ethylene exits through a pipe, while the rest of the material remains to continue production. Yu's team discusses progress toward commercial use of such devices, noting that there would be "great significance" for promoting economic development.

More information: Dehydration of Ethanol to Ethylene, *Ind. Eng. Chem. Res.*, 2013, 52 (28), pp 9505–9514. DOI: 10.1021/ie401157c

Abstract
This article is an up-to-date review of the literature available on the subject of ethanol to ethylene. The process of ethanol to ethylene has broad development prospects. Compared with the process of petroleum to ethylene, ethanol dehydration to ethylene is economically feasible. Researchers have been redirecting their interest to the ethylene production process, catalysts, and reaction mechanisms. A fluidized bed reactor, together with a wear-resistant, efficient, and stable catalyst will be the focus of future research that includes a deep understanding of the large-scale activated alumina catalyst and the molecular sieve catalyst used, and will promote the development of the ethanol dehydration to ethylene process and provide strong support for the market competiveness of the process.

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