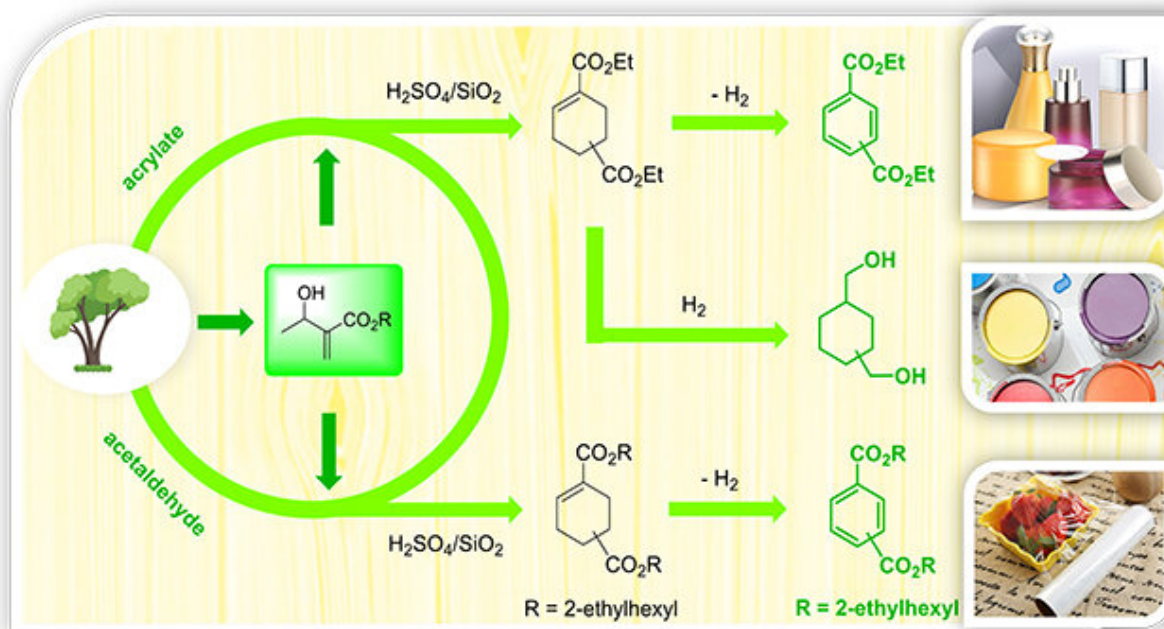


# Scientists propose new method for sustainable production of copolyester monomers with biomass

December 13 2021, by Li Yuan



A flow diagram for the production of monomers with acetaldehyde and acrylate.  
Credit: Yuan Lin

Poly (1,4-cyclohexylene dimethylene terephthalate-co-isophthalate) (PCTA) is an important copolyester that has been widely used in cosmetic containers, home appliances, and medical packaging.

Currently, PCTA is manufactured via polycondensation of cyclohexanedimethanol (CHDM), which is industrially produced from petroleum-derived xylene. To reduce the reliance on fossil energy, a more sustainable alternative method is needed.

Recently, a research team led by Prof. Zhang Tao, Prof. Wang Aiqin and Prof. Li Ning, in collaboration with Prof. Wang Feng's group, from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) developed a sustainable route for the production of copolyester monomers with biomass.

This study was published in *Angewandte Chemie International Edition* on Nov. 30.

In this study, the researchers used plant-based acrylate and acetaldehyde as feedstocks, and produced PCTA monomer in an overall yield of 61 percent. The whole process included Morita-Baylis-Hillman (MBH) reaction, one-step dehydration/Diels-Alder reaction, and final Pd/C-catalyzed dehydrogenation.

Besides, they varied the final step to hydrogenation over Pd/C-Cu/Zn/Al dual-bed catalyst, and produced UNOXOL<sup>TM</sup> diol, which is another important monomer in coatings industry, in an overall yield of 67 percent.

Furthermore, the [life cycle assessment](#) implied that the newly-developed biomass-based routes had the potential to reduce carbon footprint.

"This study paves a new way for the production of renewable PCTA and also provides a new guidance for biomass conversion," said Prof. Li.

**More information:** Lin Yuan et al, Production of Copolyester Monomers from Plant-Based Acrylate and Acetaldehyde, *Angewandte*

*Chemie International Edition* (2021). [DOI: 10.1002/anie.202113471](https://doi.org/10.1002/anie.202113471)

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