New chemical synthesis method can produce an exciting range of novel compounds
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Little previous work has focused on trying to produce a high level of a single enantiomer from reactions with 2H-azirines because these compounds are not very reactive. Here, the researchers chose to employ a phosphite, comprising phosphor and oxygen atoms, for the reaction with the 2H-azirines because of its ability to contribute or donate electrons in this reaction, promoting the transformation of azirines to aziridines.

"In the reaction of 2H-azirines with phosphite, we applied various chiral catalysts to see their effects," says Daiki Hayama of the Graduate School of Engineering, NIT. "Once we identified a catalyst that gave both a good overall yield and a high proportion of a single enantiomer in the reaction, we then focused on also optimizing the reaction conditions."

Once a particularly effective combination of conditions was identified, the team also tested
structural variations of the azirine used as starting material in the reaction along with the best catalyst found in the previous experiment, again achieving high yields and high rates of production of one of the possible enantiomers.

"Our results show that this reaction is very enantioselective and works well for a wide range of azirines," Prof. Shuichi Nakamura says. "This approach should be very useful for developing new chiral molecules potentially with interesting features, both for medical applications and for further work in the field of organic chemistry."


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Provided by Nagoya Institute of Technology


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