

Plenary Lecture
57th Annual Convention of Chemists (ACC) - Indian Chemical Society (ICS)
Recent Trends in Chemical Sciences (RTCS 2020)
Time Economy in Total Synthesis

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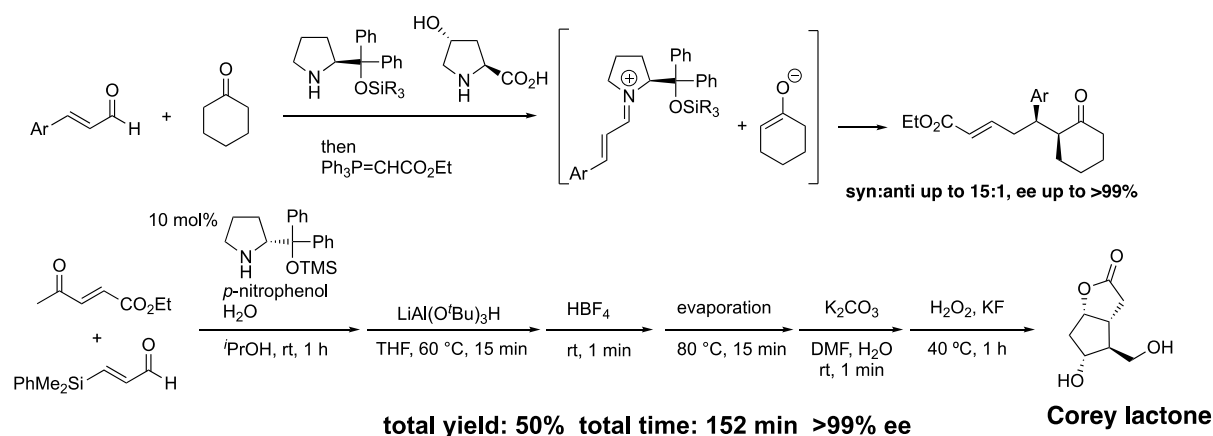
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Abstract:

It is often said that “time is money”. This is certainly true in a multistep synthesis when a high-valued product or set of products is needed urgently. It is important to synthesize the desired molecule in a short time.¹

On the other hand, organocatalysis is an effective catalyst to carry out several reactions in a same vessel. Our group² and Jørgensen's group³ independently discovered that diphenylprolinol silyl ether is an effective organocatalyst in the reaction involving enamine and iminium ion as reactive intermediates. We have been investigating the application of this organocatalyst to the one-pot synthesis of biologically active molecules.⁴

Recently, we reported the asymmetric Michael reaction of α,β -unsaturated aldehyde and non-activated ketone catalysed by diphenylprolinol silyl ether, in which the reactive nucleophile is found to be an enolate.⁵ Based on this reaction, we developed one-pot 152 minutes total synthesis of Corey lactone.⁶ A recent progress in a pot-economical synthesis will be presented.



Scheme: One-pot 152 minutes synthesis of Corey lactone

References and Notes:

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Bio-Sketch of Speaker

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Education

- 1984 B.S. The University of Tokyo, Graduate School of Science
Research adviser: Prof. Teruaki Mukaiyama
- 1992 Ph.D. The University of Tokyo, Graduate School of Science
Research adviser: Prof. Koichi Narasaka
- 1994-1996 Postdoct at Harvard University, Research adviser: Prof. E. J. Corey

Academic Background

- 1987-1998 Assistant Professor
(The University of Tokyo, Graduate School of Science)
- 1998-2006 Associate Professor
(Tokyo University of Science, Faculty of Engineering)
- 2006-2012 Professor (Tokyo University of Science, Faculty of Engineering)
- 2012-present Professor (Tohoku University, Graduate School of Science)

Award

- 1998 Incentive Award in Synthetic Organic Chemistry, Japan 1998
- 2008 SSOCJ Daiichi-Sankyo Award for Medicinal Organic Chemistry
- 2010 The Chemical Society of Japan Award for Creative Work for 2010
JSPS 2011 Award for Excellence
- 2011 Oppolzer Lecture (University of Geneva)
Inoue Prize for Science
Asian Core Program Lectureship Award (Taiwan, Singapore)
- 2011/2012 NOVARTIS Chemistry Lectureship Award
- 2014 Asian Core Program Lectureship Award (Korea)
- 2017 Asian Core Program Lectureship Award (Taiwan, Hong Kong)
- 2020 Synthetic Organic Chemistry Award in Synthetic Organic Chemistry, Japan

Research interest

Organic synthesis. Development of new synthetic methods using organocatalysis. Synthesis of biologically active natural products.