

CASE STUDY

Reaxys[®]

Prof. Keiji Hirose, Associate Professor at Osaka University

“Reaxys helps students to learn how to apply chemical reaction data”



SUMMARY

Osaka University is one of Japan's most prestigious institutions of higher education. Not only is it one of the oldest universities in the country, founded in 1838 as the Tekijuki Private School, but it is also one of the National Seven Universities, known for their great successes in research and education.

“Reaxys provides chemical reaction information in such a way that researchers can use it directly in an experimental setting.”

– Prof. Keiji Hirose, Associate Professor at Osaka University



The Department of Chemistry was founded in 1931 and it has grown to become a crucial part of the university’s research and education programs focused on this important science. Encompassing most areas of modern chemistry, it is highly respected internationally.

Professor Keiji Hirose has worked with students of the Department of Chemistry for over twenty years. He started out supporting the experimental side of the academic program, but since 2000, he has run courses including advanced organic chemistry, introduction to engineering science, and nano-scale material science. Teaching is a passion for Professor Hirose and he insists on having the best chemistry informatics tools to support his work. We interviewed him to learn more about how he uses Reaxys as an educator.

Thank you very much for agreeing to speak with us. You’ve been at Osaka University for over 20 years now, is that correct?

Yes. I started out as an assistant professor overseeing experimental chemistry sessions in 1993. I’ve been running courses as an associate professor since 2000. I teach every level, from freshmen to PhD candidates, with an average of 6 contact hours a week — plus consultation hours and prep time of course. The rest of the time, I can focus on my research.

What drew you to teaching?

It’s a pleasure to be able to see people grow in ability and understanding. It’s interesting to see how different students approach understanding and knowledge in different ways. When I see that my students come to an understanding of a topic, it validates my teaching and brings me joy.

How would you describe your teaching style?

Osaka University actually has faculty development activities, including a preparatory course for professors who are

assigned classes. I was really impressed by the importance of learned-centered lectures. This approach is one I firmly believe in. I also feel that it’s important to let students know what the benefit of the class will be. In the first lecture, I give them a clear picture of the skills and knowledge that they will gain during the lectures.

You’ve spoken about using Reaxys with students. Why did you start using Reaxys as an educational tool?

All of my students, especially those who have a synthetic chemistry major, need to be able to use tools like Reaxys. It is essential for researchers to be proficient with informatics tools. They are too important to neglect during education. Reaxys in particular is important because of its focus on facts. It accesses a fact-centric database — and it incorporates the renowned Beilstein data, which I consider essential to synthetic chemistry.

A good example of how it is useful in education: Reaxys shows students very clearly how there is often more than one answer to a question, not just one value. Take for example melting points: students think of a compound having a single

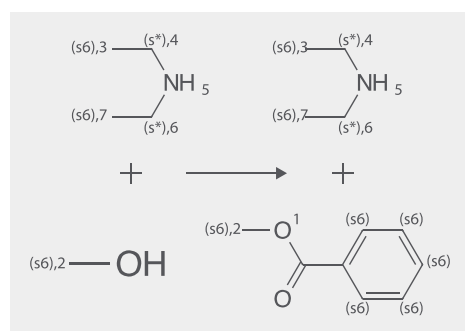


Figure 1. The search query that Professor Hirose used to find reactions where the hydroxyl group would react but the amino group would not.

melting point. However, when students look up the melting point of a compound in a database like Reaxys, they will discover a range of answers. Educational programs have to take this type of issue into account and ensure that students will know how to deal with such information.

Reaxys helps students to learn the importance of chemical reaction information, and the importance of historical information. It shows them how to collect and summarize information and how to find advanced chemical reaction technologies. Most importantly, Reaxys provides chemical reaction information in such a way that researchers can use it directly in an experimental setting — in a way, Reaxys helps students to learn how to apply chemical reaction data.

Is Reaxys the only research informatics solution you use?

No, I also use other solutions, commercial and open-source. However, Reaxys gives access to the Beilstein data, which is important. I also have a lot of educational material built around well-established Reaxys features.

Do your students also do independent research using Reaxys?

Yes, indeed. All of my seniors and post-graduates attend the Elsevier-run Reaxys training and have projects that require independent use. I like that they use Reaxys on their own because sometimes they find special or unusual reactions that we might not have considered. Reaxys helps students discover chemistry independently.

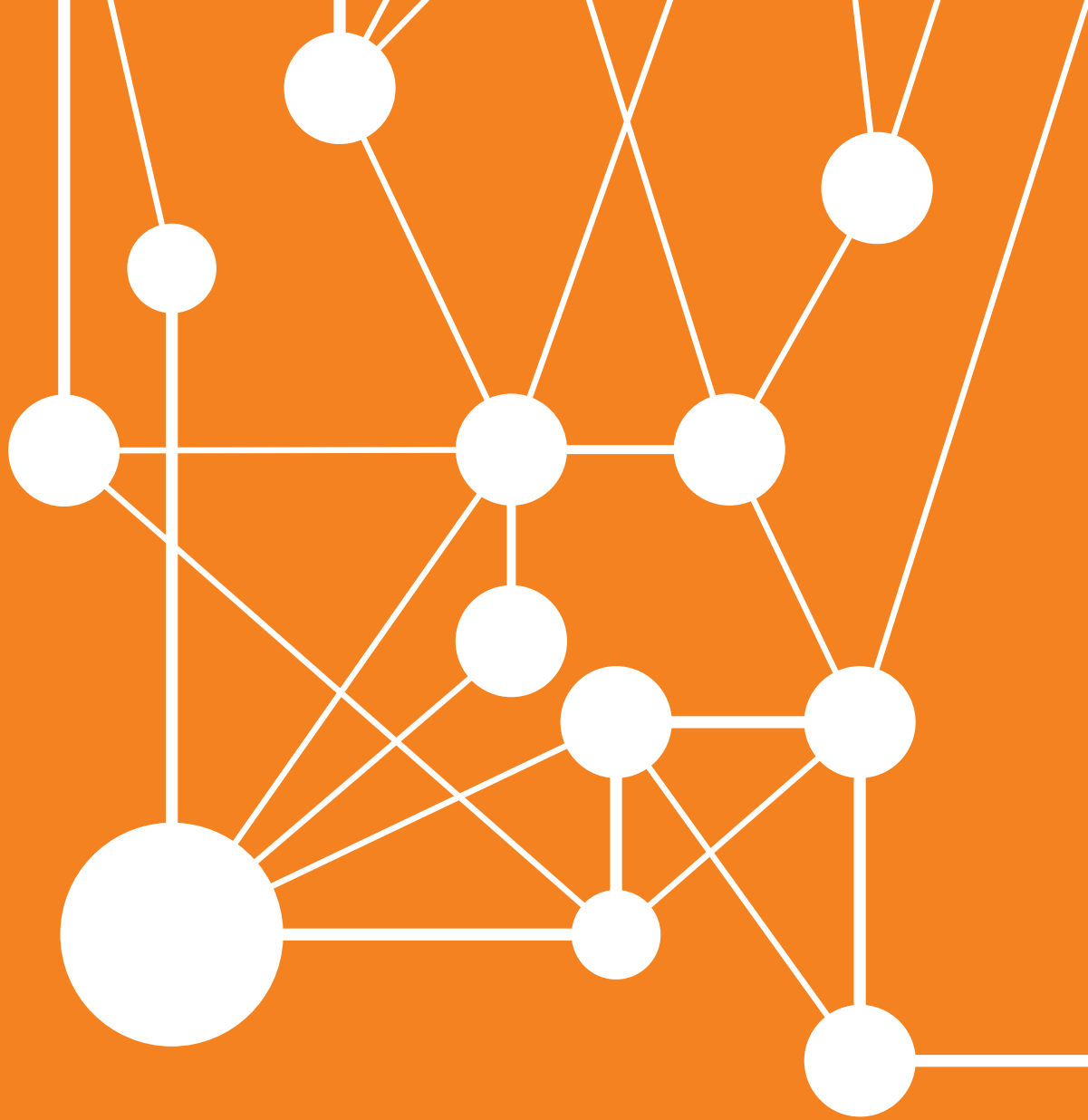
Have you had any research project that has been made easier because of access to Reaxys?

It's actually challenging to think of a specific example, because there are so many moments when Reaxys is important to me. However, I'll try to give an example. I was interested in looking at the acylation of alcohol and amine. In general, amination takes place more easily than esterification. Therefore, it is possible to only have the amino group react, without making the hydroxyl group react. But I wanted to explore a method that would make the hydroxyl group react without making the amino group react. I searched the Reaxys database and retrieved excellent search results. The search options are very convenient for this type of question.

Then I exported the results — there are a lot of options for this, which makes it easy to integrate Reaxys data into our systems. For team meetings, I use the Excel format. Anyway, with the exported results, it was easy to discuss the reactions we were interested in. It is all very clear. Reaxys makes it easy to find information and work with it in a group.

Are there any particular features of Reaxys that you find especially useful?

There are several features that I enjoy. I like the user interface. It's user-friendly and I'm happy with how it has evolved over the past few years. A particularly important feature for us is the alert function. Retrieving new information in a timely manner is essential for our projects. Reaxys helps us stay current.



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