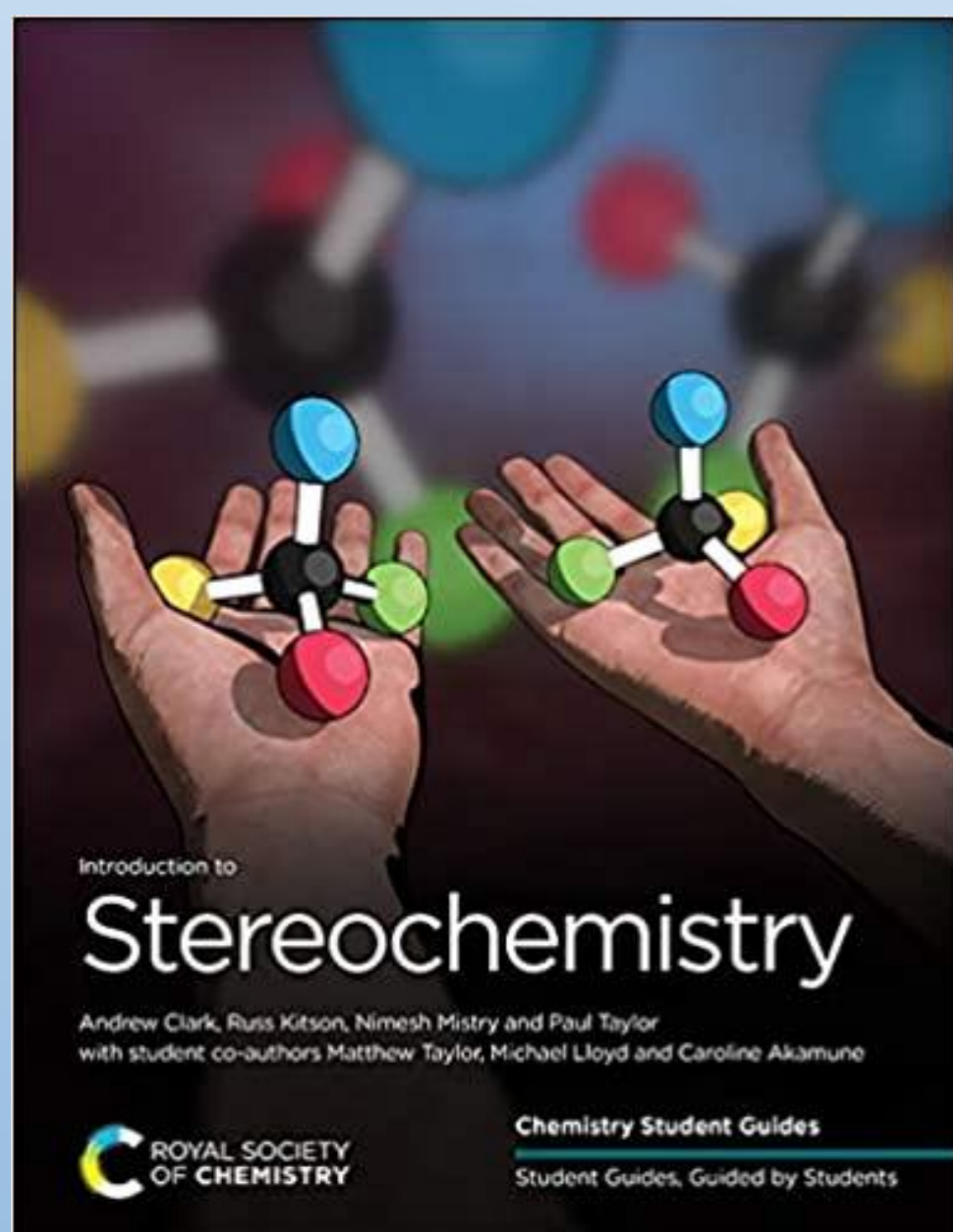
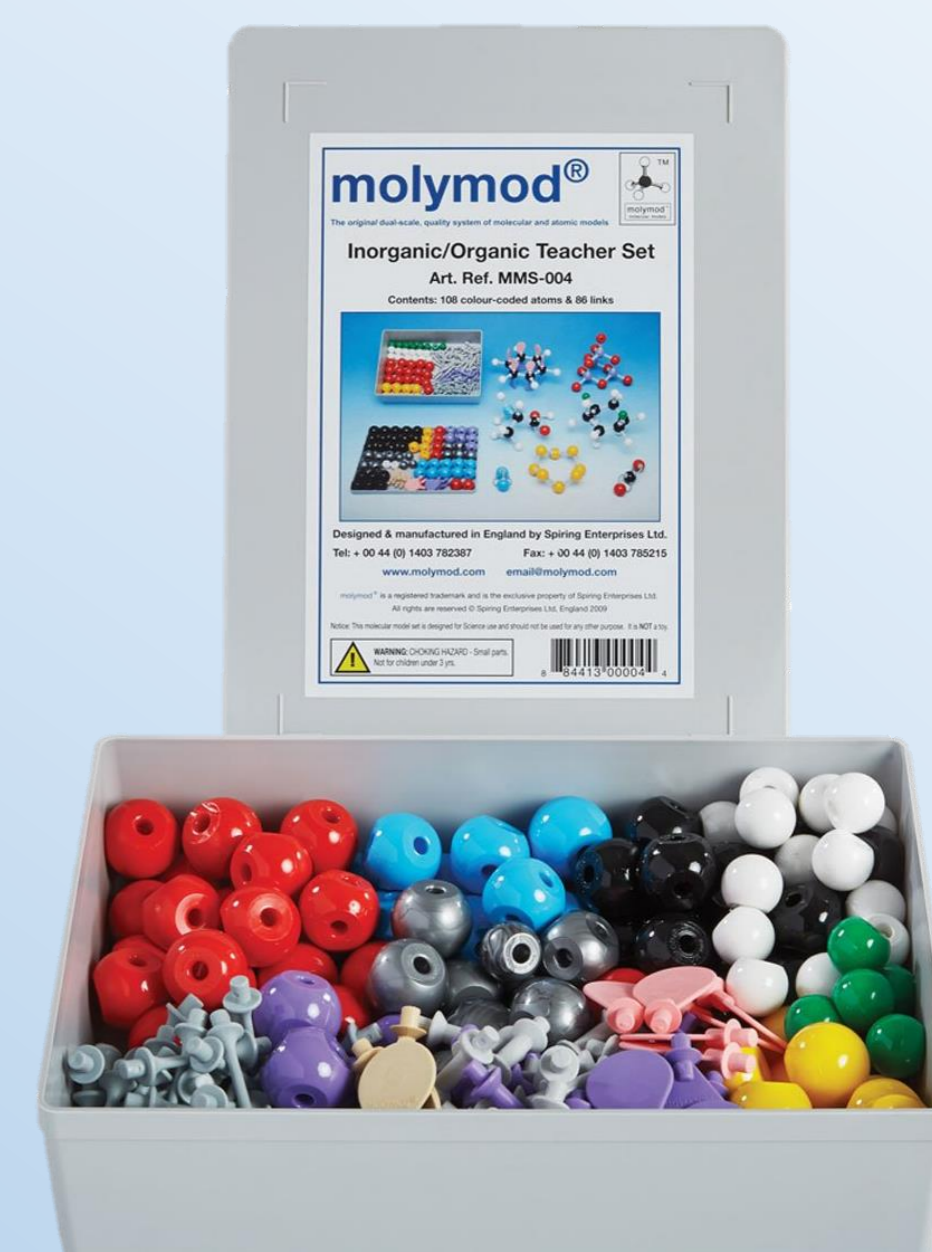


Utilisation of student co-authorship and a “hands-on” approach to improve stereochemical teaching and communication



Introduction

Stereochemistry is an important concept that often causes confusion amongst students when they learn it for the first time. Unlike most other areas of chemistry, it requires a chemist to visualise molecules in 3D, which can be difficult. Teaching visualisation is challenging and a problem-oriented approach has been used to develop this skill. Here we detail **two key complimentary strategies** in the production of a *Chemistry Student Guide* for stereochemistry.



Student Partnership

In the production of the *RSC chemistry student guide* series the input of students and student co-authorship was a major focus.¹ By doing so, we were able to understand and address common misconceptions and nuances in communication and hence improve a student's understanding. Taking those moments where students have eureka moments, and filling the book with these, allows for other students to reach that moment as soon as possible.

Through active engagement with students we found that a warmer, friendlier tone aided student engagement. Students thought the cold, impersonal language in traditional texts could demotivate. A more collaborative tone encourages students to work through problems and keep reading.

“Hands-on” Approach

Literature, including the work of former ViCEPhEC plenary speaker Paula Heron, and our own research strongly supports the use of a hands-on approach to learning topics associated with spatial cognition. Developing spatial cognition is a crucial skill for any chemist, thus utilisation of a model kit provides a powerful tool for furthering this skill.^{2,3}

Reflection

Professorial reflection: “For me and many colleagues, the Tutorial is the very best teaching experience. Imagine you are in a small-group teaching session. Your tutor or instructor invites you to grapple with the topic yourself, to make molecular models, to try various exercises, to take control of your learning, with their support. This book is designed to model that way of teaching and learning, together. In the same session, your tutor or instructor would break each topic down into component concepts, emphasising key learning points, giving top tips and checking that you had ‘got’ that component before moving on to the next stage. This book reproduces this way of learning.”

Student reflection: “Developing this body of work with the other co-authors, although arduous, has resulted in a thorough and concise introductory text. Personally, I would have loved to have a resource like this. The book's elegant progression through concepts and problems makes for a really engaging way learning stereochemistry. The book has the capacity to teach the content swiftly and in a manner that makes sitting in the library more like a set of puzzles than a silent read.

Throughout the production of this work, the student voice was held in exceptionally strong regard. The students' experiences of learning this topic has fundamentally shaped how the content has been conveyed and provided the pieces of information for student breakthroughs.

Being part of this book has been a pleasure and I would love to work on another project like it in the future.”

References

- 1 K. E. Matthews, Five Propositions for Genuine Students as Partners Practice, *Int. J. Students as Partners*, 2017, 1, 1-9.
- 2 G. Lawrie, T. Appleton, T. Wright and S. Joanne, Using multiple representations to enhance understanding of molecular structure: a blended learning activity, *Univ. Sydney Libr.*, 2012, 65-71.
- 3 K. Turner, Reasons to craft your own molecular models, <https://edu.rsc.org/ideas/reasons-to-craft-your-own-molecular-models/3009984.article>, (accessed 14 August 2020).

¹ - Department of Chemistry, University of Warwick, Coventry, CV4 7AL, United Kingdom; ² - School of Chemistry, University of Leeds, Leeds, LS2 9JT, United Kingdom; ³ - Department of Chemistry, Imperial College London, Molecular Sciences Research Hub, White City Campus, Wood Lane, W12 0BZ, United Kingdom