

Everything Solid-State in Three Weeks: CHEM296 in January Term 2018

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“CHEM296: Organic Chemical Crystallography” was a first-time attempt in January of 2018 to bring this topic to undergraduate students at an especially early stage of their academic careers. With one semester of organic chemistry being the only prerequisite for the course, the class included a mix of sophomores, juniors, and seniors. Only two students had previously encountered symmetry in previous coursework (physical chemistry). In addition to being intended to reach the widest possible audience, the course was intended to cover as broad a range of solid-state topics as possible, including not only the basics of X-ray crystallography but also some of its history and its broader application in solid-state organic chemistry. Over a period of fifteen two-hour class meetings, topics raised included X-ray diffraction and practice, point-group and space-group symmetry, Weissenberg and precession photography, solid-state photochemistry (both historical and contemporary), conventional and non-conventional hydrogen bonding in crystals, graph sets, and polymorphism. Extensive use was made of the Cambridge Structural Database. Students used the Olex² program package to refine structures provided by the instructor and the Mercury program to analyze the results. Although student feedback was generally positive, the course will require refinement before it is offered again, and the question of whether it would be more effectively offered as a semester-long course rather than concentrated into three weeks remains to be answered. As offered last January, the course did effectively provide a group of undergraduate students a window into a world of chemistry that they might not have encountered otherwise.