



Contribution ID: 133

Type: Oral Presentations

Polymorphism in Molecular Crystals: New and Old Stories

Wednesday, 30 January 2019 10:55 (25 minutes)

This contribution highlights some recent work on polymorphism in molecular crystals. First, we review the concept of conformational polymorphism [1] and its occurrence in drug compounds [2]. Conformational polymorphs may differ in properties more significantly than packing polymorphs thus they are of special interest in the pharmaceutical industry.

Second we study the crystallisation behavior of various model pharmaceuticals such as tolfenamic acid (TA) [3] and p-aminobenzoic acid (pABA) [4]. TA was studied because it has conformational polymorphs. We found that the two main conformers of TA were continuously interconverting in solution. Hence, despite the fact that two conformational polymorphs can be obtained from crystallisations, no links were found between solution conformation and crystallisation outcomes. In pABA, the effect of additives on the growth kinetics, crystal morphologies and ultimate polymorphic outcome was investigated [4]. Using small amounts of additives, we were able to crystallise the more unusual polymorph of pABA (the beta form).

Finally, we study the effect of crystal size on the thermodynamic stability of polymorphic systems. We show that milling experiments always lead to the thermodynamically stable polymorph. However, the thermodynamically stable polymorph may change as the size of the crystallites becomes smaller [5].

- [1] A. J. Cruz-Cabeza & J. Bernstein, Chem. Rev. 2014, 114, 2170–2191.
- [2] A. J. Cruz-Cabeza, S.M. Reutzel-Edens & J. Bernstein, Chem. Soc. Rev. 2015, 44, 8619.
- [3] W. Du, A. J. Cruz-Cabeza, S. Woutersen, R. J. Davey & Q. Yin, Chem. Sci. 2015, 6, 3515-3524.
- [4] J. F.B. Black, A. J. Cruz-Cabeza, R. J. Davey, R.D. Willacy, A. Yeoh, Cryst. Growth & Des. 2018, in press.
- [5] A. M. Belenguer, G. I. Lampronti, A. J. Cruz-Cabeza, C. A. Hunter, and J. K. M. Sanders, Chemical Science, 2016, 7, 6617.

Primary author: CRUZ-CABEZ, A (N/A)

Presenter: CRUZ-CABEZ, A (N/A)

Session Classification: PCCR2

Track Classification: PCCR2