Oral presentation

Multi-component crystals from the gas phase

D. A. Haynes[1]

[1]*Department of Chemistry & Polymer Science, Stellenbosch University, P. Bag X1, Matieland, 7602, South Africa*

dhaynes@sun.ac.za

Sublimation remains an under-utilised technique for the crystallisation of molecular materials [1]. Our group has explored sublimation as a method to produce organic multi-component crystals [2]. We have shown that co-crystals and salts can be selectively crystallised from the gas phase by changing the sublimation conditions [3,4]. We have also investigated the sublimation of hydrates [5], as well as the competition between hydrogen and halogen bonding in the gas phase [6], and the effect of additives on the product of the crystallisation of a dithiadiazolyl radical by sublimation [7].

Recently, we have further probed the effect of additives, as well as the polymorphic form of co-formers, on the outcome of a sublimation experiment. Results suggest that the nature and quantity of additive added to a sublimation can be used to control the outcome of a co-sublimation. We have prepared new polymorphs of co-crystals from sublimation experiments, and have also crystallised ternary co-crystals from the gas phase. These results add to our understanding of the sublimation process for multi-component crystals, and how it can be controlled to yield desired crystal forms.

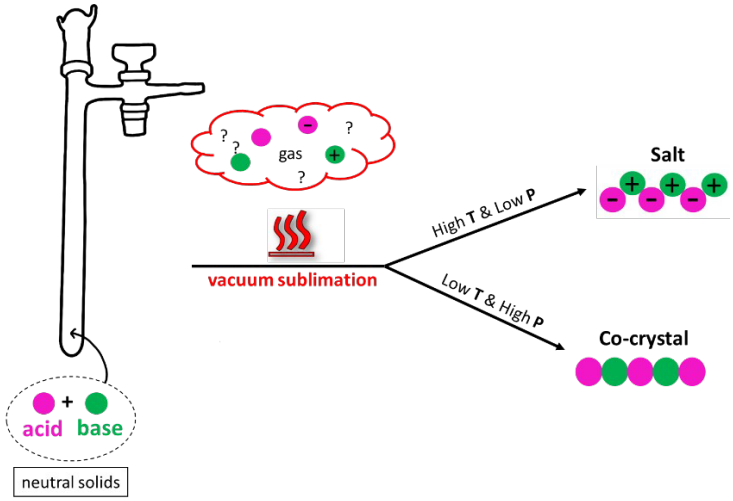

Figure 1. Experimental conditions affect the product formed from sublimation.

[1] McArdle, P. & Erxleben, A. (2021). *CrystEngComm*, **23**, 5965-5975.

[2] Lombard, J.; le Roex, T. & Haynes, D. A. (2020). *Cryst. Growth Des.*, **20**, 7840-7849.

[3] Lombard, J.; Smith, V. J.; le Roex, T. & Haynes, D. A. (2020). *CrystEngComm*, **22**, 7826-7831.

[4] Volkwyn, A. L. & Haynes, D. A. (2023). *Cryst. Growth Des.*, **23**, 8212-8220.

[5] Volkwyn, A. L. & Haynes, D. A. (2023). *CrystEngComm*, **25**, 7382-7391.

[6] Lombard, J.; le Roex, T. & Haynes, D. A. (2020). *Cryst. Growth Des.*, **20**, 7384-7391.

[7] Le Roux, S. G.; Dippenaar, A. B.; Carstens, T.; Esterhuysen, C. & Haynes, D. A. (2023). *Cryst. Growth Des.*, **23**, 2975-2801.