Poster Presentation

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A novel open tubular continuous crystalliser: design and evaluation

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The ability to continuously manufacture products can be of huge benefit to industry as it can reduce waste and capital expenditure. Continuous crystallisation has received tepid interest for many years but has come to the fore recently as it holds the potential for a radical transformation in the way crystalline products are manufactured, leading to the development method being embraced by major industries such as pharmaceuticals. In addition to the financial benefits offered by continuous crystallisation over conventional batch methods, a higher level of control over the crystallisation process can also be achieved – allowing improved, more consistent particle attributes to be obtained in the crystallisation process. This control is in part a consequence of the smaller volumes involved in continuous crystallisation, which also has the advantage of reducing any hazards associated with the materials being processed. By using smaller volumes, the mixing efficacy is inherently increased which reduces any disparity between local environments, thereby allowing kinetics to dictate the nature of the products. The EPSRC Centre for Innovative Manufacturing in Continuous Manufacturing and Crystallisation (CMAC [1]) in the UK is a collaborative national initiative to further the knowledge base and understanding of all aspects relating to continuous crystallisation and its use in the manufacturing of crystalline particulate products. In this work we present the design and construction of a novel continuous crystalliser and its evaluation using various model systems such as calcium carbonate (polymorph control [2]) and Bourne reactions (mixing efficacy [3]). The crystalliser will then be used in the co-crystallisation of agrichemical and pharmaceutical compounds with co-formers in an effort to optimise the solid-state properties of these materials such as solubility. Various aspects of the evaluation of the design of the new crystalliser will be presented with reference to these trials, and assessed critically with respect to evolution of this design and potential implementation in manufacturing processes.

[1] *http://www.cmac.ac.uk/index.php,* ***[2]*** *A.-N. Wu, W.-F. Dong, M. Antonietti, et al, Adv. Funct. Mater., 2008, 18, 1307-1313,* ***[3]*** *J. Bourne, Org. Process Res. Dev., 2003, 7, 471-508*

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