

## CRYSTAL STRUCTURES OF PHARMACEUTICALLY ACCEPTABLE CARBAMAZEPINE COCRYSTALS FROM SYNCHOTRON DATA

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Cocrystal formation is currently of great interest in the pharmaceutical industry, because cocrystallisation of an API can alter the physical properties of the drug substance, and there is also the opportunity to patent novel forms of the API. Cocrystallisation is an attractive method of altering the physical properties of APIs which contain non-ionisable groups and therefore cannot form salts.<sup>[1]</sup> Carbamazepine (CBZ) is an example of such a drug, and several cocrystals of CBZ with pharmaceutically acceptable carboxylic acids have been reported and characterised at the ‘fingerprint’ level by XRPD <sup>[2]</sup>. The crystal structures of two of these cocrystals, CBZ: (+)-camphoric acid and CBZ: 1-hydroxy-2-naphthoic acid, were solved from synchrotron data collected on the newly commissioned beamline I11 of the Diamond Light Source (DLS) at RAL. The unit cell parameters of the two CBZ cocrystals are: (a) CBZ: 1-hydroxy-2-naphthoic acid:  $P2_1/c$ ;  $a=16.688$ ,  $b=5.127$ ,  $c=24.572$  Å,  $\beta = 99.28^\circ$  and (b) CBZ: (+)-camphoric acid:  $P2_1$ ;  $a=12.580$ ,  $b=13.140$ ,  $c=14.473$  Å,  $\beta = 105.72^\circ$ . A comparison of these structures with related carbamazepine crystal structures will also be presented.

[1] McNamara, D. P., Childs, S. L., Giordano, J., Iarriccio, A., Cassidy, J., Shet, M. S., Mannion, R., O'Donnell, E. & Park, A. (2006). *Pharmaceutical Research* **23**, 1888-1897.

[2] Childs, S. L., Rodriguez-Hornedo, N., Reddy, L. S., Jayasankar, A., Maheshwari, C., McCausland, L., Shipplett, R. & Stahly, B. C. (2008). *Crystengcomm* **10**, 856-864.