[MS25-P04] "Predicting" crystal forms of pharmaceuticals using hydrogen bond propensities.

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Polymorphs are of importance in the pharmaceutical and other specialty chemical industries.[1] For commercial exploitation, patenting is granted only to "nonobvious" forms, and it could be thought that due to the vast amount of research already done in the field, the question of the predictability of crystal forms could be answered. Hydrogen bonds are the most widely used interaction in crystal engineering. A new hydrogen bond propensities tool has been implemented in the solid form module of CSD's Mercury.[2] This tool allows for viewing the relevant hydrogen bond patterns, and thus crystal forms, possible for a molecule. Here a trial is performed to see if there is a correlation between the presence of polymorphism and the results of the hydrogen bonding propensity analysis for pharmaceutical actives. A positive correlation would require reconsidering what is "nonobvious". The compounds chosen are from a list of around 300 pharmaceuticals, which have not been found to have polymorphs.[3] The hydrogen bonding propensity analysis was done on a subset of around 60 compounds from the list. According to the results, seven compounds were chosen for a small experimental crystal form screening. Two compounds show polymorphs with single-crystal-tosingle-crystal phase transformations, which do not involve hydrogen bond changes.

[1] J. Bernstein, *Cryst. Growth Des*., **2011**, *11*, 632-650. C. F. Macrae, I. J. Bruno, J. A. Chisholm, P. R. Edgington, P. McCabe, E. Pidcock, L. Rodriguez-Monge, Taylor, J. van de Streek and P. A. Wood, *J. Appl. Cryst.*, **2008**, *41*, 466-470.
[3] List received from Prof. Ulrich Griesser.

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