

Sucrose compressed into a new polymorph

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For decades (+)-sucrose, the well known table sugar and the organic compound produced in the largest amounts in the pure form, was regarded as a contradiction to McCrown's statement [1], that the number of polymorphs is proportional to the effort and time spent on the crystallization of a compound. Despite the huge production of sucrose, no polymorphs were found and indeed, it has been applied as a standard of monomorphous compounds.

We have applied high pressure for studying the compression of sucrose and found that it undergoes a phase transition to a new form II at 4.8 GPa [2]. The phase transition is isostructural, as it does not change the crystal symmetry. However, the crystal structure is drastically refurnished: all intermolecular hydrogen bonds are transformed and the molecular conformation is changed. But most importantly, the sucrose-II structure reveals the effect of pressure for changing the types of intermolecular interactions in molecular crystals. At elevated pressure the CH \cdots O bonds become much more important than at ambient conditions.

References

- [1] W. C. McCrown in *Physics and Chemistry of Organic Solid State*, Vol. 2 (Eds.: D. Fox, M. M. Labes, A. Weissberger), Wiley-Interscience, New York, 1965, pp. 725 – 767.
- [2] E. Patyk, J. Skumiel, M. Podsiadło, A. Katrusiak, *High-Pressure (+)-Sucrose Polymorph*, *Angew. Chem. Int. Ed.* **2012**, *51*, 2146-2150.