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High-pressure crystallisation from solution: extending the search space for novel physical forms of "large small molecules"

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The application of high pressure is a powerful method for exploring the polymorphic behaviour of simple molecular compounds.[1-4] Direct compression of either single crystals or powders, and crystal growth from the melt are two methods that have been successfully used to prepare new polymorphs.[1-4] The recent development of the experimental technique for in situ high-pressure crystallisation of single crystals from solution has allowed a wider range of compounds to be studied, including small-molecule pharmaceuticals, and has enabled the preparation of new forms at modest pressures, typically 0.1-1.5 GPa.[5] Exemplified with the study of the antibiotic ciprofloxacin,[6] whose chemical formula comprises 24 non-H atoms, we describe how: a) the technique can be extended for the study of larger, more complex compounds of biological importance; b) high-pressure forms can be recovered to ambient-pressure conditions. The key role played by the use of synchrotron radiation for collecting high-quality high-pressure data on single crystals of light-scattering organic compounds is also discussed.

References

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