

Supplementary Information

Controlling the Solid-State and Particle Properties of a Fixed-Dose Combination Co-Amorphous System by Spray Drying

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Methods

Solubility Screening

The following calculation was followed to determine the solubility of both carbamazepine and chlorothiazide in each solvent:

Mass of the sample jar and wet sample – mass of the sample jar = mass of solution

Mass of the sample jar and dry sample – mass of the sample jar = mass of solute

Mass of solution – mass of solute = mass of solvent

$$\frac{\text{Mass of solvent}}{\text{Density of solvent}} = \text{volume of solvent}$$

$$\text{Solubility} = \frac{\text{Mass of solute}}{\text{Volume of solvent}} \text{ (g/ml)}$$

Design of Experiments

Table S1 DOE produced by JMP Pro.

Run Number	Feed (ml/min)	Atomising gas (L/h)
1	0.9	742
2	2.1	742
3	1.5	536
4	0.9	536
5	0.9	357
6	1.5	742
7	2.1	536
8	2.1	357
9	1.5	357

Results

Thermal Analysis

Table S2 Weight loss occurrences in the TGA thermograms for DOE 1-9.

DOE No.	Weight loss		
	50 – 150 °C	150-300 °C	300-450 °C
DOE 1R	4.789%	48.14%	23.41%
DOE 2R	5.335%	54.85%	23.53%
DOE 3R	5.119%	53.51%	23.49%
DOE 4R	5.284%	51.71%	24.43%
DOE 5R	5.573%	51.14%	23.75%
DOE 6R	4.893%	52.66%	24.34%
DOE 7R	5.479%	53.54%	23.52%
DOE 8R	5.444%	54.60%	23.69%
DOE 9R	4.870%	52.65%	23.64%

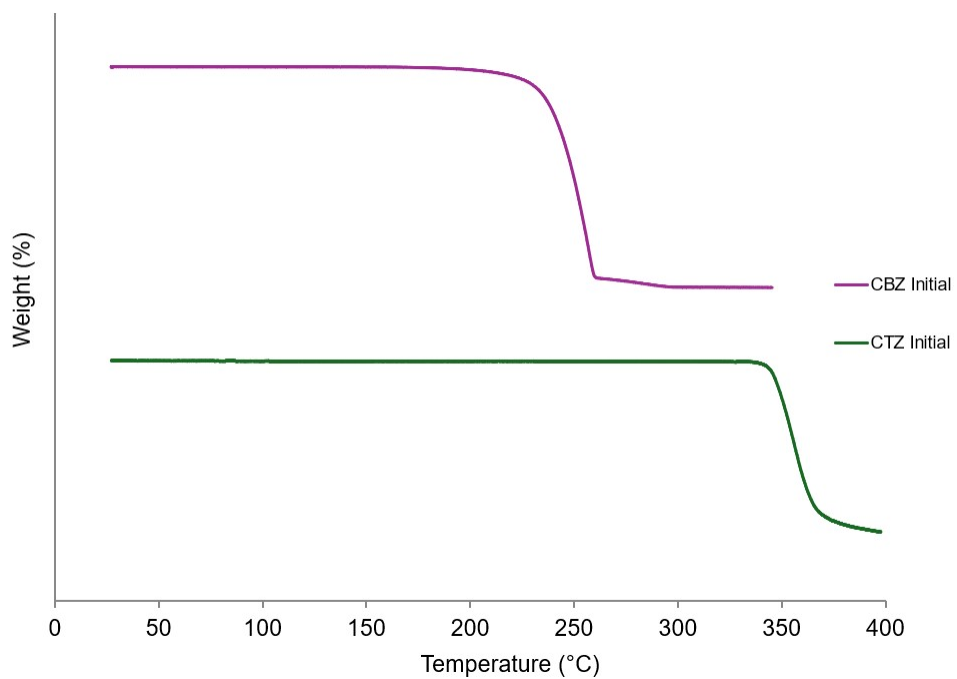


Figure S1 TGA thermograms of CBZ initial and CTZ initial.

Solid-State Analysis

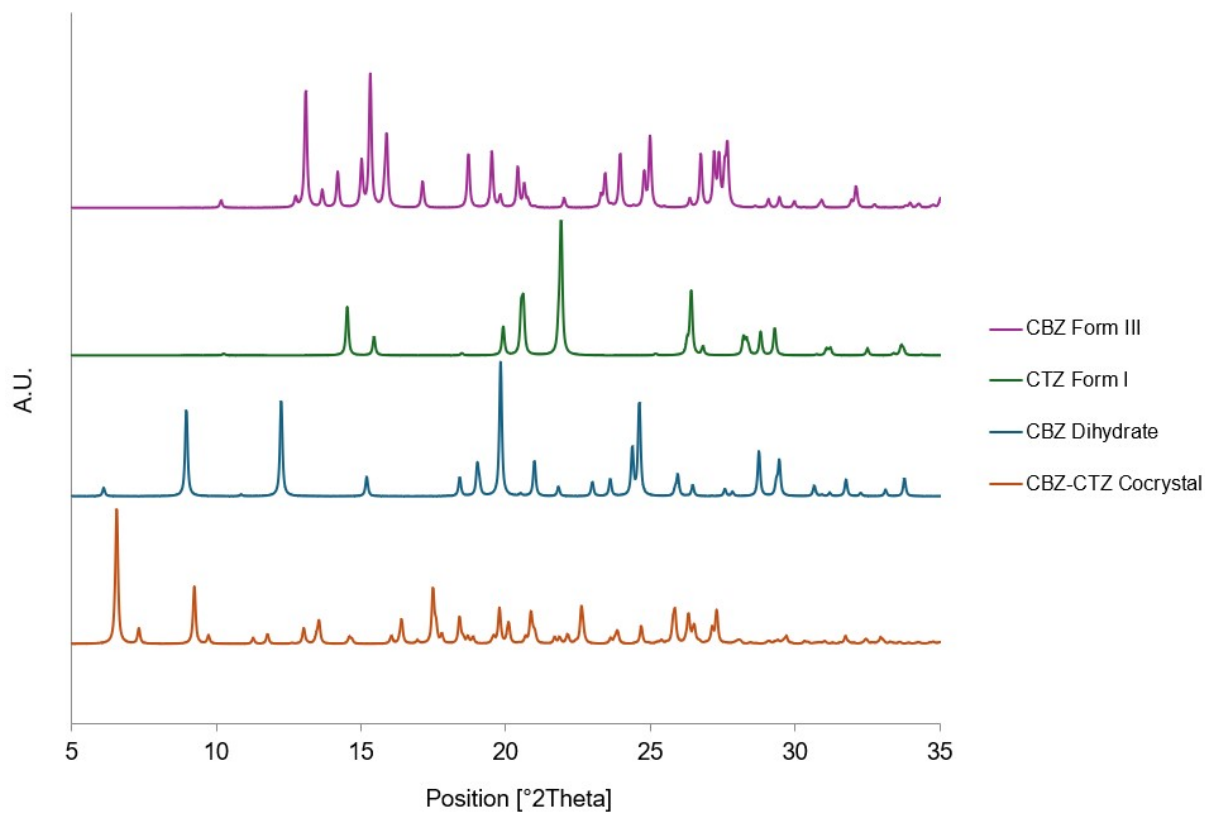


Figure S2 Calculated diffractograms for CBZ Form III (CSD Refcode: CBMZPN10), CTZ form I (CSD Refcode: QQQAUG09), the CBZ dihydrate (CSD Refcode: FEFNOT11) and the CBZ-CTZ cocrystal (CSD Refcode: VEJZUI).