# Extraordinary Long-Term-Stability in Kinetically Stabilized Amorphous Solid Dispersions of Fenofibrate

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## Solubility Curve

Solubility curves in Figure 1 were constructed by fitting the experimental solubility data with the equation (1)[0],

$$T_s = -Ae^{-0.05x} + T_m + C \qquad (1)$$

where $T_s$ is the solubility temperature of drug in drug–polymer mixture (◦C); $T_m$ is the melting point of the pure drug (◦C); $x$ is the drug load (wt %); $A$ and $C$ are fitting variables; $C = 0$, for systems that exhibit repulsive or no drug–polymer interaction, and $C = 1, 2, 3, 4 \ldots$ for systems that exhibit attractive drug–polymer interaction.

**Table S1:** List of A and C fitting variables used in construction of solubility curves

| **Drug-polymer** | **A** | **C** |
|---|---|---|
| Fenofibrate/( Copovidone/Labrafil) | 39.5 | 0 |

**Ref:** Kyerematen, S. O.; Pudlas, M.; Woehrle, G. H., A fast and reliable empirical approach for estimating solubility of crystalline drugs in polymers for hot melt extrusion formulations. *Journal of pharmaceutical sciences* **2014,** *103* (9), 2847-58

## DSC Thermogramms

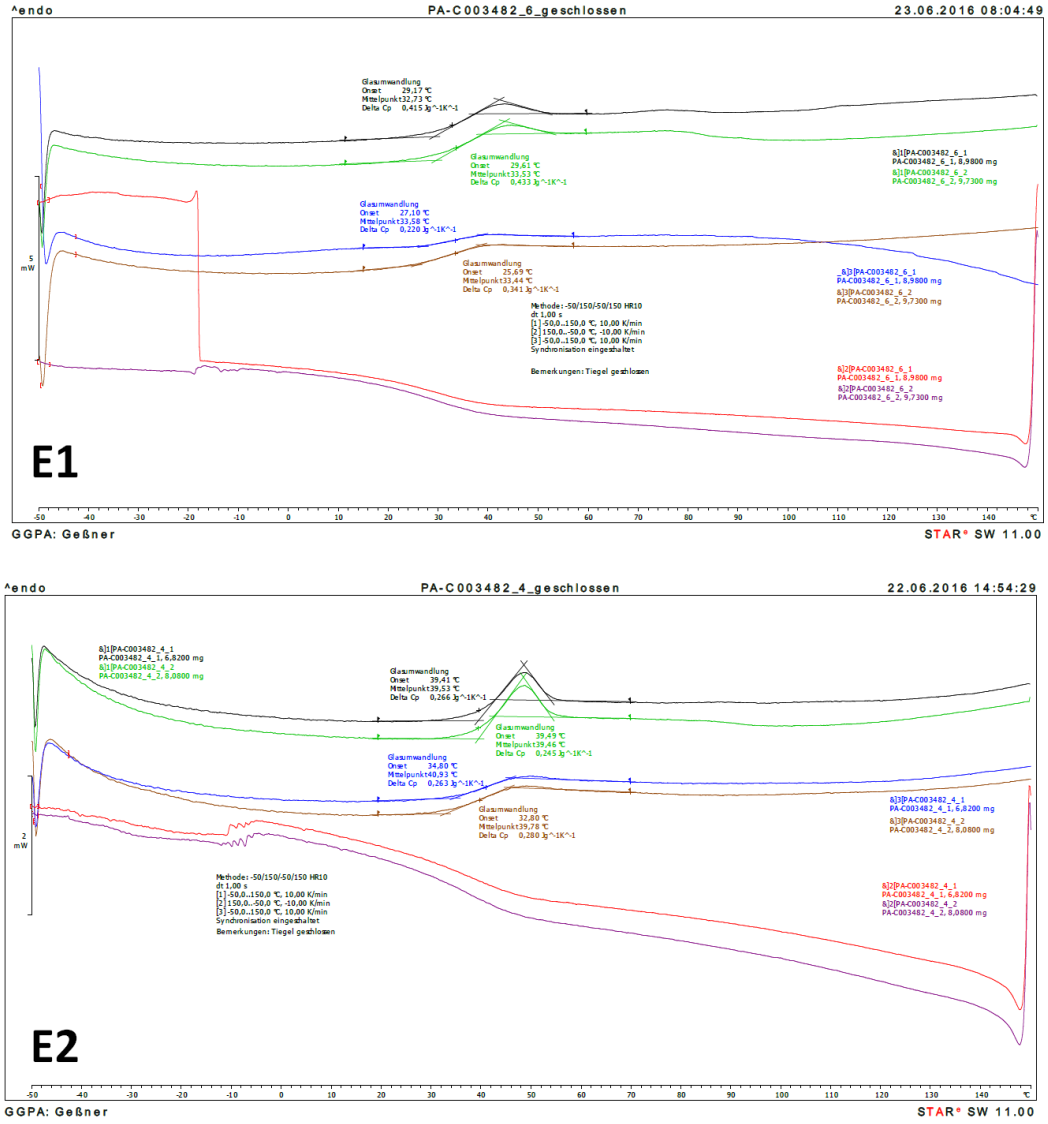


**Figure S1:** Thermograms of the investigated fenofibrate extrudates E1 and E2. Two separate samples were measured for each extrudate. Red and green curves represent the first heating cycle, blue and brown curves the second heating cycle. The cooling cycle is given in red and purple.

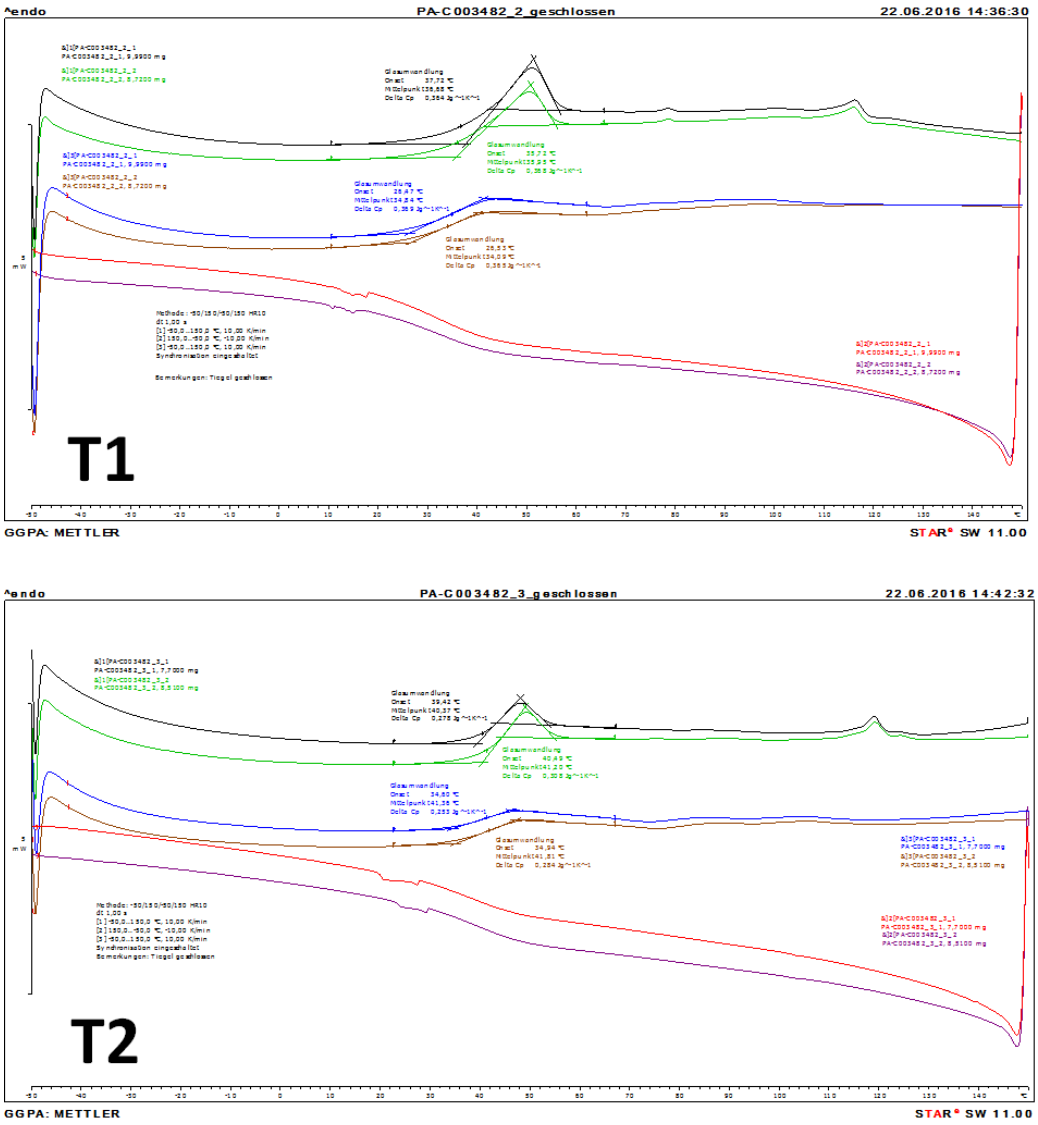


**Figure S2:** Thermograms of the investigated fenofibrate tablets T1 and T2. Two separate samples were measured for each extrudate. Red and green curves represent the first heating cycle, blue and brown curves the second heating cycle. The cooling cycle is given in red and purple.

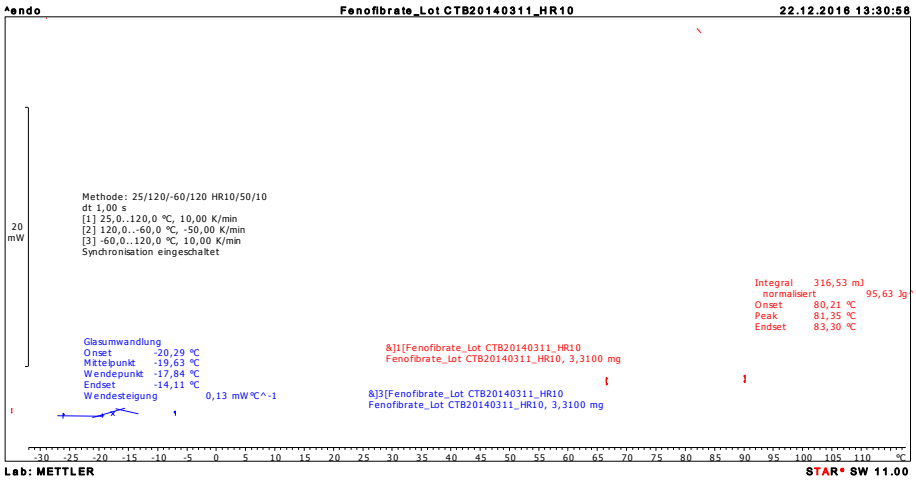


**Figure S3:** Thermogram of pure fenofibrate showing the melting peak of crystalline API and the glas transition of amorphous fenofibrate.

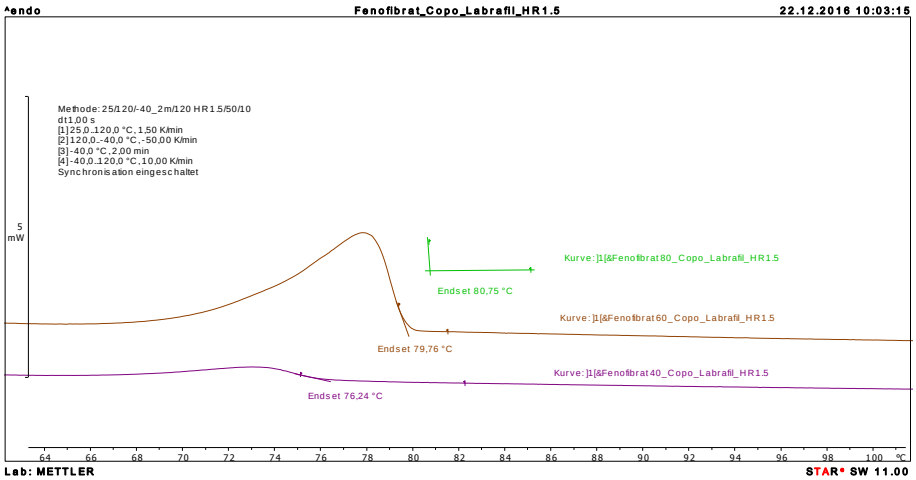


**Figure S4:** Thermograms showing the dissolution end temperature for mixtures with 80 %(w/w) green, 60 %(w/w) brown and 40 %(w/w) purple fenofibrate in the matrix.

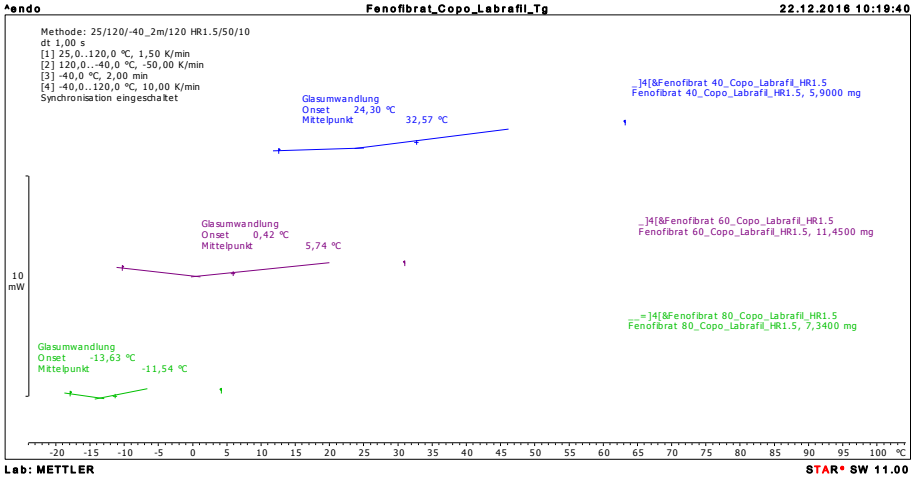


**Figure S5:** Thermograms showing the dissolution end temperature for mixtures with 80 %(w/w) green, 60 %(w/w) brown and 40 %(w/w) purple fenofibrate in the matrix.

## TRS calibration

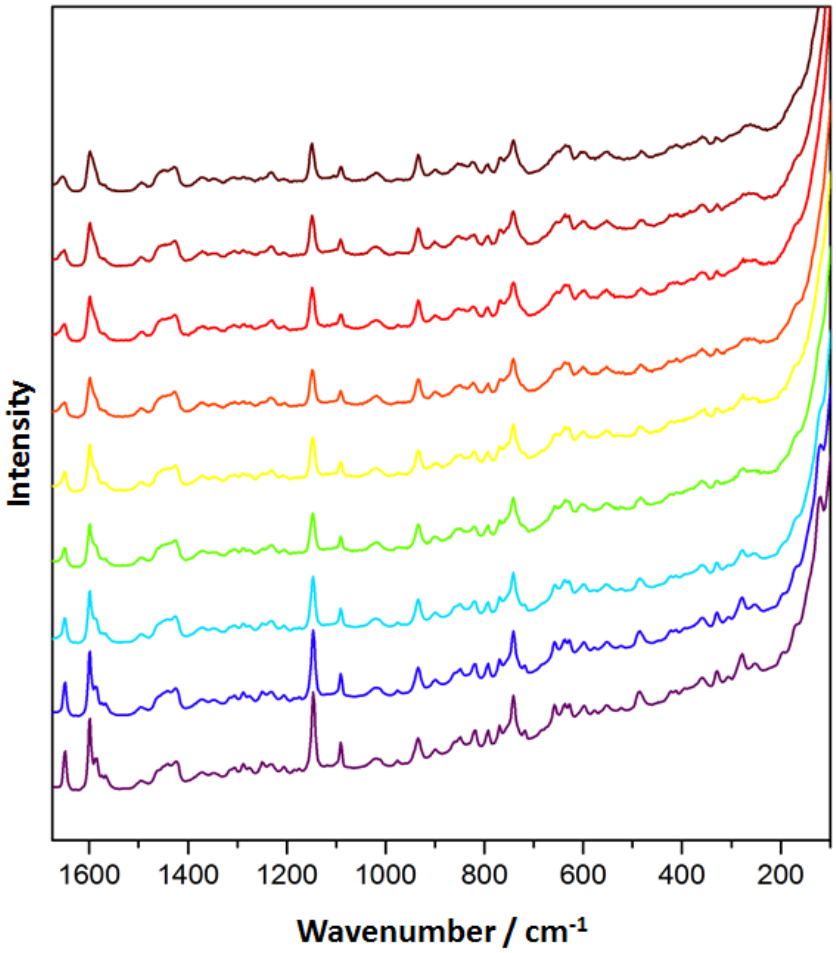


**Figure S6:** TRS spectra of the samples of the calibration set. Note that for the sake of simplicity only one spectrum per spiking level is depicted. From top to bottom: 15, 12, 9, 7.5, 6, 4.5, 3, 1.5, 0 % cAPI (w/w).

**Table S2:** Figures of merit of the chemometric calibration.

| Factor | RMSEP | SEP | Bias | Slope | Offset | Expl. Var / % | RMSEC | RMSECV |
|---|---|---|---|---|---|---|---|---|
| Factor-1 | 3.06 | 3.30 | 0.62 | 0.38 | 4.66 | 86.67 | 2.91 | 3.06 |
| Factor-2 | 1.24 | 1.26 | -0.09 | 0.95 | 0.25 | 97.99 | 1.13 | 1.24 |
| Factor-3 | 0.89 | 0.91 | -0.01 | 0.97 | 0.19 | 99.24 | 0.70 | 0.89 |
| Factor-4 | 0.72 | 0.73 | -0.02 | 0.99 | 0.04 | 99.81 | 0.35 | 0.72 |

## Dynamic vapor sorption

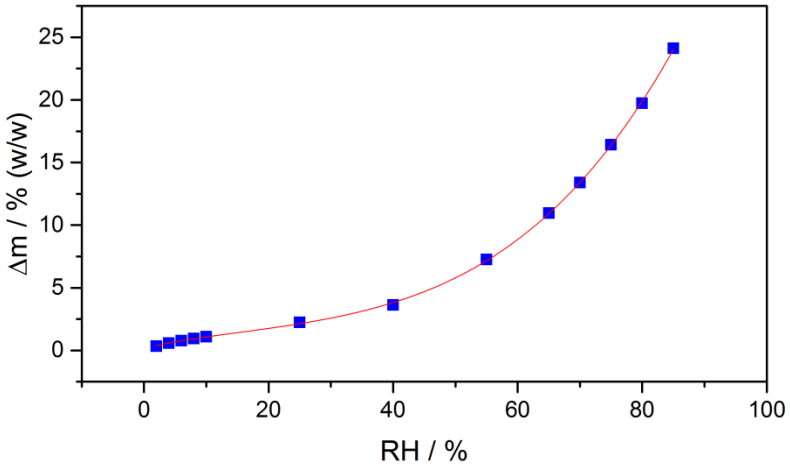


**Figure S7**: DVS data fitted with the Peleg-function.

Fit Data:

$$y = K1\left(\frac{x}{100}\right)^{n1} + K2\left(\frac{x}{100}\right)^{n2}$$

| | |
|---|---|
| K1 | 4.6 ± 0.5 |
| K2 | 36.1 ± 0.4 |
| n1 | 0.64 ± 0.05 |
| n2 | 3.68 ± 0.09 |
| $R^2$ | 0.999 |

**Ref:** Peleg, M., **1993**. Assessment of a semi-empirical four parameter general model for sigmoid moisture sorption isotherms. *Journal of Food Process Engineering* 16, 21-37.