Supporting Information to

Process Design for Continuous Crystallization of L-Tryptophan in Water-Alcohol Solvent Mixtures

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Table S1: Results and standard deviations of the determined solubilities of L-Trp in water/1-PrOH mixtures

T [°C]	$w_{1\text{-PrOH}}$ $[g_{1-PrOH}\ g_{W+1-PrOH}^{-1}]$	X_{Trp} $[g_{Trp}\ g_{W+1-PrOH}^{-1}]$	$\sigma(X_{Trp})$ $[g_{Trp}\ g_{W+1-PrOH}^{-1}]$	Number of individually equilibrated suspensions | total samples [-]
10	0.199	0.01085	$6.64 \cdot 10^{-5}$	1 | 3
	0.400	0.01800	$3.25 \cdot 10^{-5}$	1 | 3
	0.598	0.01613	$1.14 \cdot 10^{-4}$	1 | 3
20	0.200	0,01530	$2.93 \cdot 10^{-4}$	2 | 6
	0.400	0.02253	$2.43 \cdot 10^{-5}$	1 | 3
	0.600	0.01930	$7.30 \cdot 10^{-5}$	1 | 3
	0.100	0.00036	$6.00 \cdot 10^{-5}$	1 | 3
30	0.201	0.02007	$2.45 \cdot 10^{-5}$	1 | 3
	0.400	0.03117	$8.04 \cdot 10^{-5}$	1 | 3
	0.598	0.02323	$2.85 \cdot 10^{-5}$	1 | 3
	0.100	0.00070	$1.50 \cdot 10^{-4}$	1 | 3
40	0.196	0.02538	$2.29 \cdot 10^{-5}$	1 | 3
	0.394	0.03412	$5.55 \cdot 10^{-5}$	1 | 3
	0.599	0.02689	$5.16 \cdot 10^{-5}$	1 | 3
50	0.201	0.03229	$8.35 \cdot 10^{-5}$	1 | 3
	0.398	0.04274	$3.26 \cdot 10^{-5}$	1 | 3
	0.597	0.03247	$3.70 \cdot 10^{-4}$	1 | 3

Table S2: Results and standard deviations of the determined solubilities of L-Trp in water-iPrOH mixtures

T [°C]	w_{iPrOH} $[g_{iPrOH}\ g_{W+iPrOH}^{-1}]$	X_{Trp} $[g_{Trp}\ g_{W+iPrOH}^{-1}]$	$\sigma(X_{Trp})$ $[g_{Trp}\ g_{W+iPrOH}^{-1}]$	Number of individually equilibrated suspensions | total samples [-]
10	0.201	0.00717	$7.92 \cdot 10^{-5}$	1 | 3
	0.401	0.01056	$2.40 \cdot 10^{-5}$	1 | 3
	0.598	0.00901	$2.33 \cdot 10^{-5}$	1 | 3
20	0.199	0.01009	$6.75 \cdot 10^{-5}$	3 | 9
	0.396	0.01380	$9.05 \cdot 10^{-5}$	1 | 3
	0.598	0.01102	$5.51 \cdot 10^{-5}$	2 | 6
	1.000	0.00021	$6.41 \cdot 10^{-5}$	1 | 3
30	0.201	0.01454	$4.00 \cdot 10^{-5}$	1 | 3
	0.396	0.01830	$1.11 \cdot 10^{-5}$	1 | 2
	0.599	0.01346	$3.04 \cdot 10^{-5}$	1 | 3
	1.000	0.00022	$3.65 \cdot 10^{-5}$	1 | 3
40	0.200	0.01878	$1.60 \cdot 10^{-4}$	1 | 2
	0.400	0.02286	$7.19 \cdot 10^{-5}$	1 | 3
	0.605	0.01572	$2.65 \cdot 10^{-5}$	1 | 3
50	0.199	0.02460	$1.92 \cdot 10^{-4}$	1 | 3
	0.400	0.02812	$1.87 \cdot 10^{-4}$	1 | 3
	0.592	0.01942	$1.43 \cdot 10^{-5}$	1 | 3

Table S3: Widths of the MSZW as a function of the solvent system and the cooling rate *r*

Solvent	r [K min^{-1}]	ΔT_{MSZW} [°C]	Δt_{MSZW} [min]
W	0.1	13.6± 0.4	189.7± 6.7
	0.5	20.5± 1.8	57.0± 3.0
	1.0	25.4± 1.4	33.7± 1.5
W+ 1-PrOH $w_{1\text{-}PrOH}$ = 25.6 wt.-%	0.1	9.8± 0.2	153.7± 1.5
	0.5	12.5± 0.5	41.7± 1.2
	1.0	15.4± 0.6	23.7± 0.6
W+ iPrOH w_{iPrOH} = 20.0 wt.-%	0.1	8.4± 0.3	134.3± 2.5
	0.5	11.3± 1.1	39.0± 2.0
	1.0	12.2± 1.8	20.0± 2.0

Exemplarily for the temperature influence, the crystals formed from 1-PrOH- and iPrOH/water solutions saturated at a temperature of 30 °C are shown in Figure SI-1 lhs for water and the water/1-PrOH mixture. The images of the L-Trp crystals formed after cooling crystallization of the equilibrated saturated solutions at 50 °C are given in Figure SI-1 rhs.

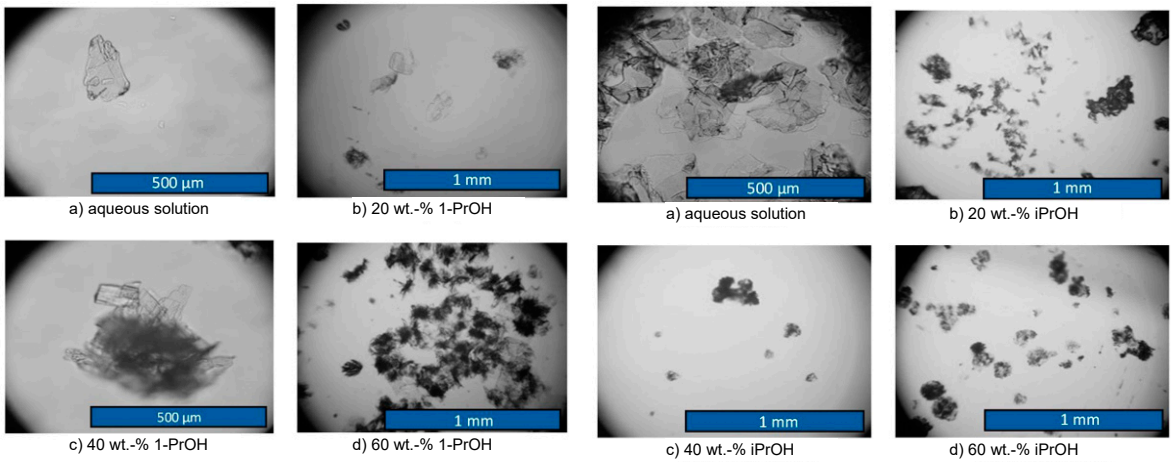


Figure S1. lhs: Microscope images of the L-Trp crystals formed at different 1-PrOH-proportions in the solvent of the saturated solution at 30 °C after crystallization in an ice bath; rhs: Microscope images of the L-Trp crystals formed at different iPrOH proportions in the solvent of the saturated solution at 50 °C after crystallization in an ice bath.

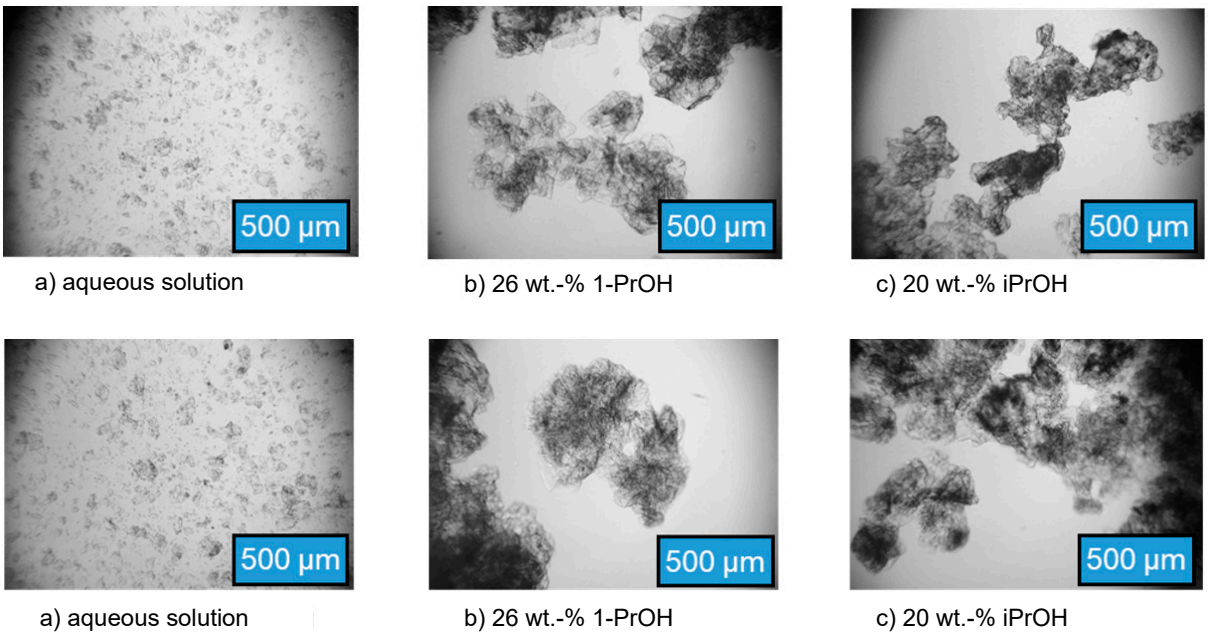


Figure S2. top row: Product crystals from batch cooling crystallization at a cooling rate of 0.5 K min^{-1} from various solvent systems. Bottom row: Product crystals from batch cooling crystallization at a cooling rate of 1.0 K min^{-1} from various solvent systems.