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Design of two-component molecular crystals with defined melting points

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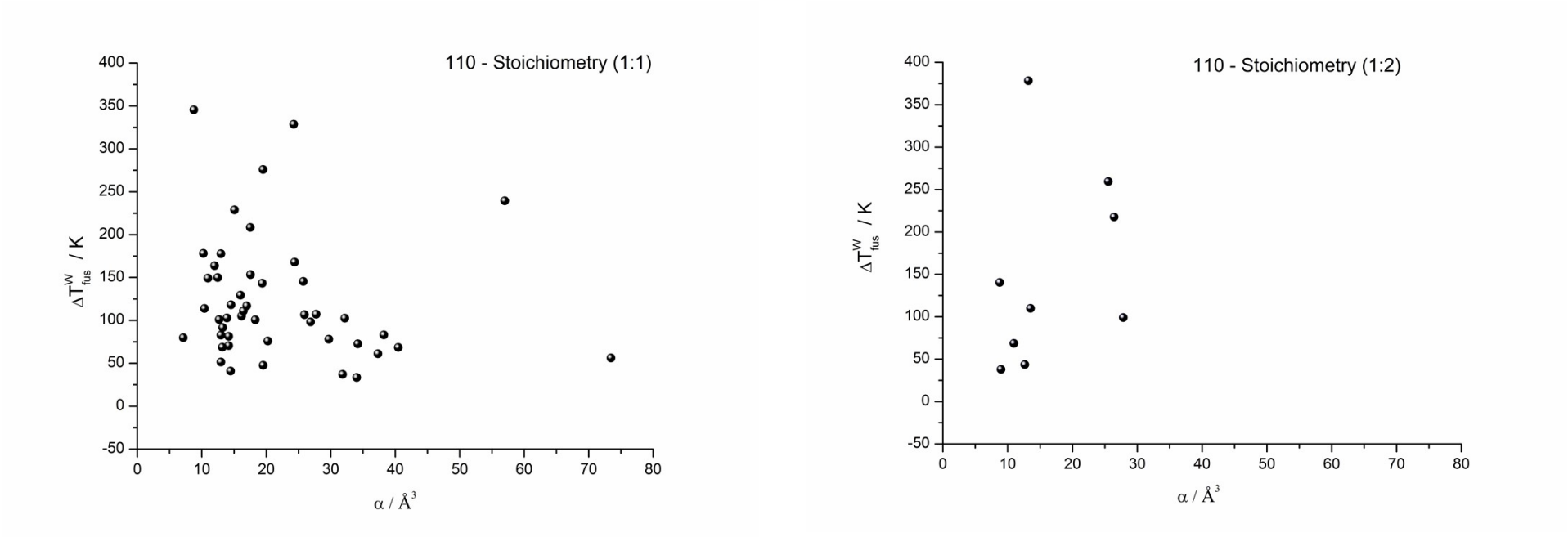
Table 1S. Coefficients of the correlation equation (1) for the clusters including the considered compound as a one from the components of the two-component crystal

№	CF1	CF1:CF2			A	B	R[a]	σ[b]	n[c]	T_{fus} /°C	L	B	H	T^{E}_{fus} /K	T^{F}_{fus} /K	$\mid T^{W}_{fus} \mid$ /K	2σ[b]	T^{E}_{fus} /°C	T^{F}_{fus} /°C
1	1-hydroxy-2-naphthoic acid	1:1			202±59	0.525±0.136	0.8246	23.30	9	192.0	1	1	0	425.3	501.2	76.0	46.6	152.1	228.1
2	2,3,5,6-F-4-I-Benzoic Acid	1:1			31±77	1.065±0.211	0.9458	12.00	5	151.0	0	1	1	-476.9	369.2	846.1	24	-750.1	96.0
3	2,4-OH-Benzoic Acid	1:1			119±41	0.717±0.089	0.9309	15.90	12	213.0	1	1	0	420.5	512.1	91.6	31.8	147.3	238.9
4	2-Acetaminopyridine		2:1		150±46	0.579±0.104	0.8922	20.50	10	69.0	0	1	0	356.3	331.9	24.4	41.0	83.1	58.7
5	2-OH-Benzamide	1:1			214±36	0.441±0.080	0.9006	10.90	9	140.8	1	1	0	382.8	453.4	70.6	21.8	109.7	180.3
6	2-Pyridone	1:1			105±51	0.657±0.121	0.9121	16.80	8	107.8	1	1	0	306.1	420.0	113.9	33.6	33.0	146.9
7	3,5-OH-Benzoic Acid	1:1			255±39	0.522±0.081	0.9335	19.10	8	237.5	0	1	1	533.5	489.8	43.7	38.2	260.3	216.6
8	3-OH-Benzoic Acid	1:1			241±22	0.404±0.047	0.9032	15.20	19	203.0	1	1	0	404.4	582.1	177.7	30.4	131.2	308.9
9	4-Bromobenzamide		2:1		142±115	0.704±0.271	0.7576	19.80	7	191.5	0	1	0	479.7	458.3	21.4	39.6	206.6	185.2
10	4-nitro-Phenol	1:1	2:1		175±39	0.612±0.097	0.9031	19.30	11	113.5	0	1	1	451.0	345.8	105.2	38.6	177.9	72.7
11	4-Phenylpyridine	1:1	2:1		182±44	0.449±0.111	0.8964	14.40	6	69.5	0	1	0	330.3	357.8	27.5	28.8	57.2	84.6
12	p-toluenesulfonic acid	1:1			17±20	0.988±0.040	0.9967	5.60	6	106.5	0	1	1	1416.7	367.1	1049.6	11.2	1143.5	93.9
13	Aakeroy_1			1:2	251±39	0.421±0.099	0.8854	12.20	7	158.5	0	1	0	433.5	429.1	4.4	24.4	160.4	155.9
14	Acetazolamide	1:1	2:1	1:2	162±39	0.698±0.940	0.9339	15.70	10	258.5	0	1	0	536.4	529.6	6.8	31.4	263.3	256.4
15	Acridine	1:1			8±55	0.905±0.122	0.8988	18.00	15	108.5	1	1	0	84.2	412.9	328.7	36.0	-188.9	139.7
16	AMG517	1:1			207±35	0.593±0.089	0.8871	15.60	14	230.0	0	1	0	508.6	499.4	9.2	31.2	235.4	226.3
17	Arbidol	1:1	2:1		329±28	0.190±0.061	0.8728	8.02	5	124.8	0	1	1	406.2	362.9	43.3	16.04	133.0	89.7
18	Benzamide	1:1			151±39	0.561±0.082	0.9215	13.10	9	128.5	1	1	0	344.0	446.8	102.8	26.2	70.8	173.6
19	Benzoic Acid	1:1			97±45	0.701±0.701	0.8319	27.40	24	122.0	1	1	0	324.4	425.3	100.9	54.8	51.3	152.2
20	**Benzotrifuroxan**	**1:1**			**231±38**	**0.545±0.091**	**0.9488**	**12.50**	**6**	**197.4**	**0**	**1**	**1**	**507.7**	**439.5**	**68.2**	**25.0**	**234.5**	**166.4**
21	1,2-bis(4-pyridyl)propane	1:1			252±32	0.361±0.072	0.8455	17.50	12	54.5	0	1	1	394.4	209.6	184.8	35.0	121.2	-63.6
22	trans-Cinnamic Acid	1:1			168±36	0.523±0.079	0.9469	9.56	7	134.0	1	1	0	352.2	457.3	105.1	19.12	79.1	184.1
23	Clotrimazole	1:1	2:1		210±41	0.461±0.091	0.9298	7.36	6	148.0	1	1	0	389.6	458.0	68.4	14.72	116.5	184.9
24	Dapson	1:1	2:1	1:2	208±36	0.484±0.087	0.9407	10.80	6	177.5	1	1	0	403.1	501.3	98.2	21.6	130.0	228.2
25	Edaravone	1:1			165±29	0.421±0.099	0.9690	11.50	7	128.0	1	1	0	285.0	560.9	276.0	23.0	11.8	287.8
26	Febuxostat	1:1			328±31	0.266±0.070	0.8400	9.28	7	201.0	1	1	0	446.9	549.4	102.6	18.56	173.7	276.3
27	Flufenamic Acid	1:1			190±37	0.544±0.083	0.9563	11.60	6	133.9	0	1	0	416.7	399.0	17.7	23.2	143.5	125.8
28	Furosemide	1:1			264±24	0.406±0.055	0.8870	19.40	17	203.0	1	1	0	444.4	522.5	78.1	38.8	171.3	249.4
29	Gabapentin	1:1			205±31	0.470±0.071	0.9198	6.74	10	161.0	1	1	0	386.8	487.6	100.8	13.48	113.6	214.4
30	Glycolic Acid	1:1			209±34	0.414±0.069	0.9492	8.62	6	75.0	0	1	1	356.7	336.1	20.5	17.24	83.5	63.0
31	**Imatinib mesylate**	**1:1**		**1:2**	**375±12**	**0.175±0.022**	**0.9397**	**4.30**	**10**	**223.3**	**1**	**1**	**0**	**454.5**	**694.0**	**239.5**	**8.6**	**181.4**	**420.9**
32	Indomethacin	1:1			181±37	0.548±0.081	0.9490	10.20	7	160.8	1	1	0	400.4	461.6	61.1	20.4	127.3	188.4
33	Lamotrigine	1:1			45±12	0.980±0.027	0.9988	2.83	5	217.3	0	1	1	2250.0	454.5	1795.5	5.66	1976.9	181.4
34	Lornoxicam	1:1			364±24	0.246±0.057	0.9274	5.88	5	227.5	1	1	0	482.8	555.5	72.7	11.76	209.6	282.3
35	Maleic Acid	1:1			166±30	0.585±0.064	0.9127	15.80	19	139.0	0	1	0	400.0	420.8	20.8	31.6	126.9	147.6

36	L-Malic Acid	1:1		1:2	131±55	0.678±0.117	0.9215	14.00	8	101.0	0	1	1	406.8	358.6	48.2	28.0	133.7	85.5
37	Malonic Acid	1:1			168±49	0.541±0.100	0.8632	17.40	12	136.0	1	1	0	366.0	445.7	79.7	34.8	92.9	172.6
38	Methyl-Paraben	1:1			-15±18	0.911±0.039	0.9956	4.55	7	126.5	1	1	0	-168.5	455.2	623.7	9.1	-441.7	182.0
39	Meloxicam	1:1			251±37	0.508±0.087	0.8688	14.50	13	254.0	1	1	0	510.2	543.6	33.4	29.0	237.0	270.5
40	Nicotinic Acid	1:1			46±38	0.873±0.079	0.9724	15.90	9	232.0	1	1	0	362.2	525.9	163.7	31.8	89.1	252.8
41	Norfloxacin	1:1			245±52	0.485±0.114	0.8493	22.50	9	220.6	0	1	0	475.7	512.9	37.2	45.0	202.6	239.7
42	p-Coumaric acid	1:1			296±18	0.338±0.040	0.9535	7.22	9	211.5	1	1	0	447.1	558.1	111.0	14.44	174.0	285.0
43	Paracetamol	1:1			297±17	0.272±0.037	0.9338	6.97	10	170.0	1	1	0	408.0	537.3	129.3	13.94	134.8	264.2
44	Phenazine	1:1	2:1	1:2	16±83	0.968±0.178	0.9252	25.90	7	177.0	0	1	1	500.0	448.5	51.5	51.8	226.9	175.4
45	Pimelic Acid	1:1		1:2	144±46	0.592±0.110	0.8626	13.30	12	104.0	1	1	0	352.9	393.8	40.9	26.6	79.8	120.7
46	Pyrazinamide	1:1			145±29	0.609±0.062	0.8569	13.50	37	189.0	1	1	0	370.8	520.8	149.9	27.0	97.7	247.6
47	Resorcinol	1:1			235±45	0.474±0.097	0.8786	14.30	9	110.5	0	1	1	446.8	313.6	133.2	28.6	173.6	40.5
48	**Saccharin**	**1:1**			**242±21**	**0.459±0.047**	**0.8504**	**13.50**	**39**	**227.9**	**1**	**1**	**0**	**447.3**	**564.4**	**117.1**	**27.0**	**174.2**	**291.2**
49	2-OH-Benzoic Acid	1:1			189±35	0.533±0.073	0.8305	20.20	26	159.0	1	1	0	404.7	456.2	51.5	40.4	131.6	183.0
50	Sulfadimidine	1:1			337±28	0.284±0.060	0.7036	12.80	25	197.0	0	1	0	470.7	468.8	1.8	25.6	197.5	195.7
51	Tefagur	1:1			288±58	0.262±0.126	0.7683	15.50	5	171.7	1	1	0	390.2	598.7	208.4	31.0	117.1	325.5
52	Tenoxicam	1:1			324±72	0.341±0.182	0.7348	7.76	5	209.5	0	1	1	491.7	465.2	26.4	15.52	218.5	192.1
53	Theophylline	1:1			197±33	0.571±0.075	0.8079	18.50	33	273.6	1	1	0	459.2	612.5	153.3	37.0	186.1	339.4
54	**2,4,6-Trinitrotoluene**	**1:1**			**242±27**	**0.331±0.063**	**0.8451**	**14.60**	**13**	**80.5**	**0**	**1**	**0**	**361.7**	**337.3**	**24.4**	**29.2**	**88.6**	**64.2**
55	Urea	1:1			210±42	0.504±0.088	0.8041	17.40	20	134.3	0	1	0	423.4	391.8	31.6	34.8	150.2	118.6
56	Vanillic Acid	1:1	2:1	1:2	285±26	0.308±0.053	0.9104	10.90	9	209.2	1	1	0	411.8	640.7	228.9	21.8	138.7	367.6
57	Adefovir dipivoxil	1:1			234±55	0.375±0.126	0.8303	15.30	6	93.3	0	1	0	374.4	353.2	21.2	30.6	101.3	80.1
58	Diethylstilbestrol	1:1		1:2	35±39	0.997±0.144	0.9516	13.50	7	182.1	0	1	1	11666.7	421.5	11245.2	27.0	11393.5	148.4
59	Itraconazole	1:1	2:1	1:2	87±44	0.780±0.104	0.9424	11.20	9	166.2	1	1	0	395.5	451.7	56.3	22.4	122.3	178.6
60	Resveratrol	1:1		1:2	252±57	0.457±0.125	0.9034	16.40	5	267.7	0	1	1	464.1	632.1	168.0	32.8	190.9	358.9
61	Stanozolol	1:1			282±99	0.416±0.214	0.7466	19.00	5	244.3	1	1	0	482.9	566.0	83.1	38.0	209.7	292.8
62	4-Aminobenzoic Acid	1:1			156±22	0.621±0.047	0.9396	13.60	25	189.0	1	1	0	411.6	493.0	81.4	27.2	138.5	219.8
63	Flurbiprofen	1:1			117±45	0.629±0.096	0.8914	16.90	13	109.3	1	1	0	315.4	422.0	106.7	33.8	42.2	148.9
64	Glutaric acid			1:2	254±38	0.372±0.078	0.9217	15.70	6	96.5	0	1	1	404.5	310.9	93.6	31.4	131.3	37.7
65	Oxalic Acid			1:2	144±56	0.695±0.123	0.8528	25.10	14	189.0	0	1	0	472.1	457.8	14.4	50.2	199.0	184.6
66	Pyrazine			1:2	1±19	0.997±0.045	0.9929	11.60	9	52.0	0	1	0	333.3	325.1	8.2	23.2	60.2	52.0
67	Quercetin			1:2	204±84	0.567±0.159	0.8032	24.50	9	321.4	1	1	0	471.1	688.8	217.7	49.0	198.0	415.7
68	D- or L-Tartaric Acid	1:1			59±23	0.801±0.047	0.9881	5.18	9	166.0	1	1	0	296.5	474.6	178.1	10.36	23.3	201.4
69	Sebacic acid	1:1			233±53	0.465±0.127	0.8532	17.70	7	132.0	0	1	1	435.5	370.2	65.3	35.4	162.4	97.1
70	1,2-bis(4-pyridyl)ethylene	1:1			262±41	0.419±0.089	0.8561	16.50	10	151.5	0	1	1	451.0	388.2	62.8	33.0	177.8	115.0
1	1,4-diiodotetrafluorobenzene	1:1			106±32	0.738±0.083	0.9168	20.70	17	109.0	0	1	0	404.6	374.2	30.4	41.4	131.4	101.0

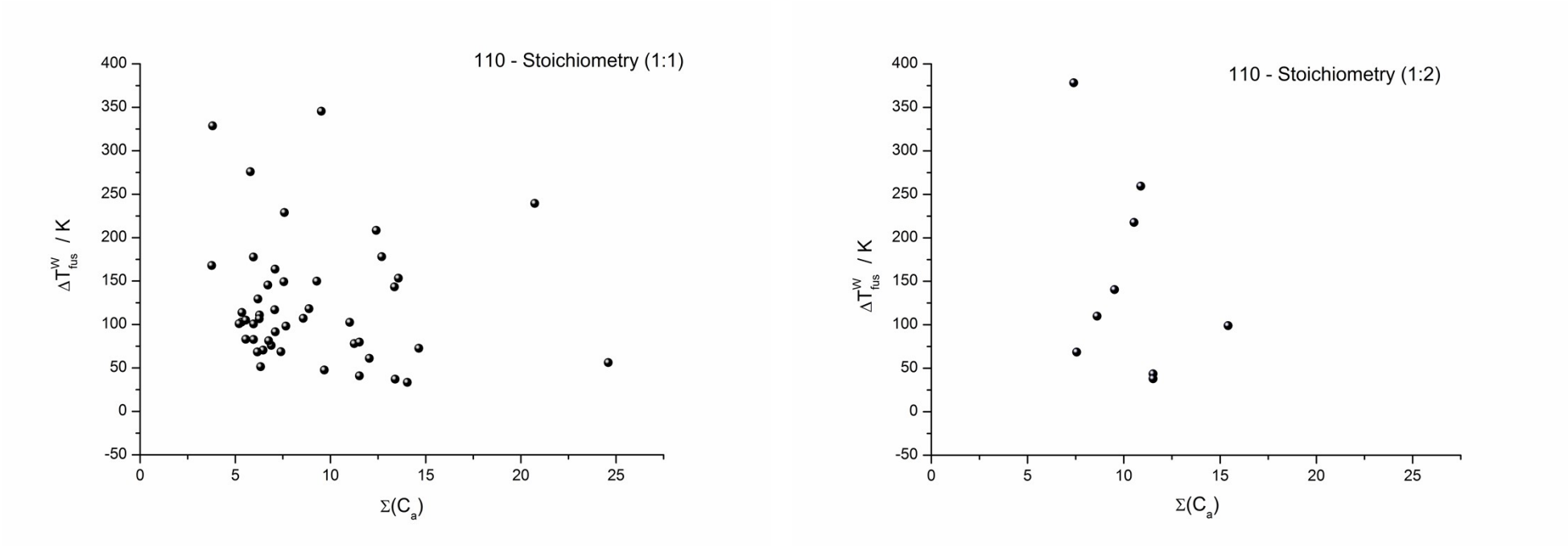
	1,4-diiodotetrafluorobenzene			1:2	271±62	0.306±0.171	0.4313	25.40	16	109.0	0	1	0	390.5	363.2	27.3	50.8	117.3	90.1
2	4-OH-Benzoic Acid	1:1			128±24	0.702±0.054	0.9228	14.60	31	214.5	1	1	0	429.5	512.3	82.8	29.2	156.4	239.2
	4-OH-Benzoic Acid		2:1		295±40	0.446±0.097	0.8990	19.10	7	214.5	0	1	1	532.5	432.0	100.5	38.2	259.3	158.8
3	Adipic Acid	1:1			156±43	0.644±0.098	0.9003	15.00	12	152.1	0	1	0	438.2	418.1	20.1	30.0	165.1	144.9
	Adipic Acid			1:2	148±35	0.628±0.077	0.9040	17.00	17	152.1	1	1	0	397.8	441.5	43.6	34.0	124.7	168.3
4	1,2-bis-(4-pyridyl)ethane	1:1			300±22	0.305±0.049	0.8396	14.30	18	112.0	0	1	1	431.7	279.2	152.5	28.6	158.5	6.0
	1,2-bis-(4-pyridyl)ethane			1:2	236±33	0.402±0.078	0.8906	14.80	9	112.0	0	1	0	394.6	371.0	23.6	29.6	121.5	97.9
5	Caffeine	1:1			132±21	0.673±0.045	0.9512	16.00	26	227.0	1	1	0	403.7	547.0	143.4	32.0	130.5	273.9
	Caffeine		2:1		223±30	0.445±0.063	0.9623	10.20	6	227.0	1	1	0	401.8	622.8	221.0	20.4	128.7	349.7
6	Carbamazepine	1:1			245±15	0.415±0.032	0.8990	11.50	42	190.1	1	1	0	418.8	525.9	107.1	23.0	145.7	252.8
	Carbamazepine		2:1		275±61	0.369±0.142	0.6544	18.30	11	190.1	1	1	0	435.8	510.2	74.3	36.6	162.7	237.0
7	**CL20**			**1:2**	**114±78**	**0.743±0.176**	**0.9039**	**24.10**	**6**	**244.0**	**1**	**1**	**0**	**443.6**	**542.6**	**99.0**	**48.2**	**170.4**	**269.4**
	CL20		2:1		118±22	0.712±0.044	0.9963	7.93	4	244.0	1	1	0	409.7	560.6	150.9	15.86	136.6	287.5
8	Fumaric Acid	1:1			303±30	0.324±0.065	0.7802	17.80	18	287.0	1	1	0	448.2	793.7	345.4	35.6	175.1	520.5
	Fumaric Acid			1:2	103±28	0.772±0.063	0.9261	19.10	27	287.0	1	1	0	451.8	592.2	140.4	38.2	178.6	319.0
9	Gallic Acid	1:1			236±62	0.547±0.138	0.8318	15.40	9	250.0	0	1	0	521.0	525.0	4.0	30.8	247.8	251.8
	Gallic Acid			1:2	164±27	0.638±0.064	0.9807	6.31	6	250.0	1	1	0	453.0	562.9	109.9	12.62	179.9	289.8
10	Hydrochlorothiazide	1:1			104±44	0.839±0.105	0.9428	16.40	10	269.0	0	1	1	646.0	522.2	123.7	32.8	372.8	249.1
	Hydrochlorothiazide			1:2	272±24	0.385±0.061	0.9642	7.37	5	269.0	1	1	0	442.3	701.7	259.4	14.74	169.1	428.5
11	Isoniazid	1:1			195±23	0.495±0.052	0.8782	14.50	29	171.5	1	1	0	386.1	504.3	118.2	29.0	113.0	231.2
	Isoniazid		2:1		271±30	0.316±0.063	0.8582	12.80	11	171.5	1	1	0	396.2	549.5	153.3	25.6	123.0	276.4
12	Isonicotinamide	1:1			243±26	0.420±0.059	0.7533	21.90	41	156.0	0	1	0	419.0	443.2	24.2	43.8	145.8	170.1
	Isonicotinamide		2:1		265±23	0.400±0.051	0.8919	14.30	18	156.0	0	1	1	441.7	410.4	31.3	28.6	168.5	137.2
	Isonicotinamide			1:2	220±27	0.513±0.064	0.9704	7.36	6	156.0	0	1	1	451.7	407.7	44.0	14.72	178.6	134.5
13	D- or L-Proline	1:1			258±14	0.413±0.030	0.9394	11.80	27	228.0	1	1	0	439.5	588.7	149.2	23.6	166.4	315.6
	D- or L-Proline			1:2	246±34	0.475±0.084	0.9423	4.22	6	228.0	1	1	0	468.6	537.2	68.6	8.44	195.4	264.0
14	Naproxen	1:1			135±32	0.604±0.069	0.9407	10.70	12	155.6	1	1	0	340.9	486.3	145.4	21.4	67.8	213.2
	Naproxen		2:1		263±27	0.349±0.063	0.9413	7.62	6	155.6	1	1	0	404.0	474.9	70.9	15.24	130.8	201.8
15	Nicotinamide	1:1			178±15	0.514±0.033	0.8936	15.60	63	128.4	1	1	0	366.3	434.9	68.7	31.2	93.1	161.8
	Nicotinamide			1:2	-73±71	1.086±0.151	0.9381	16.80	9	128.4	1	1	0	848.8	437.0	411.9	33.6	575.7	163.8
	Nicotinamide		2:1		268±28	0.322±0.058	0.8907	14.30	10	128.4	0	1	0	395.3	414.8	19.5	28.6	122.1	141.6
16	Riluzole	1:1			319±45	0.216±0.102	0.6237	12.60	9	118.0	0	1	1	406.9	334.0	72.9	25.2	133.7	60.9
	Riluzole		2:1		165±58	0.555±0.140	0.8706	11.60	7	118.0	1	1	0	370.8	407.5	36.7	23.2	97.6	134.3
17	Succinic Acid	1:1			276±24	0.371±0.053	0.7952	20.90	31	184.0	1	1	0	438.8	488.3	49.5	41.8	165.6	215.1
	Succinic Acid			1:2	155±30	0.624±0.067	0.8666	17.00	31	184.0	1	1	0	412.2	484.2	72.0	34	139.1	211.1

[a] Pair correlation coefficient;
[b] Standard deviation;
[c] A number of points in the cluster;



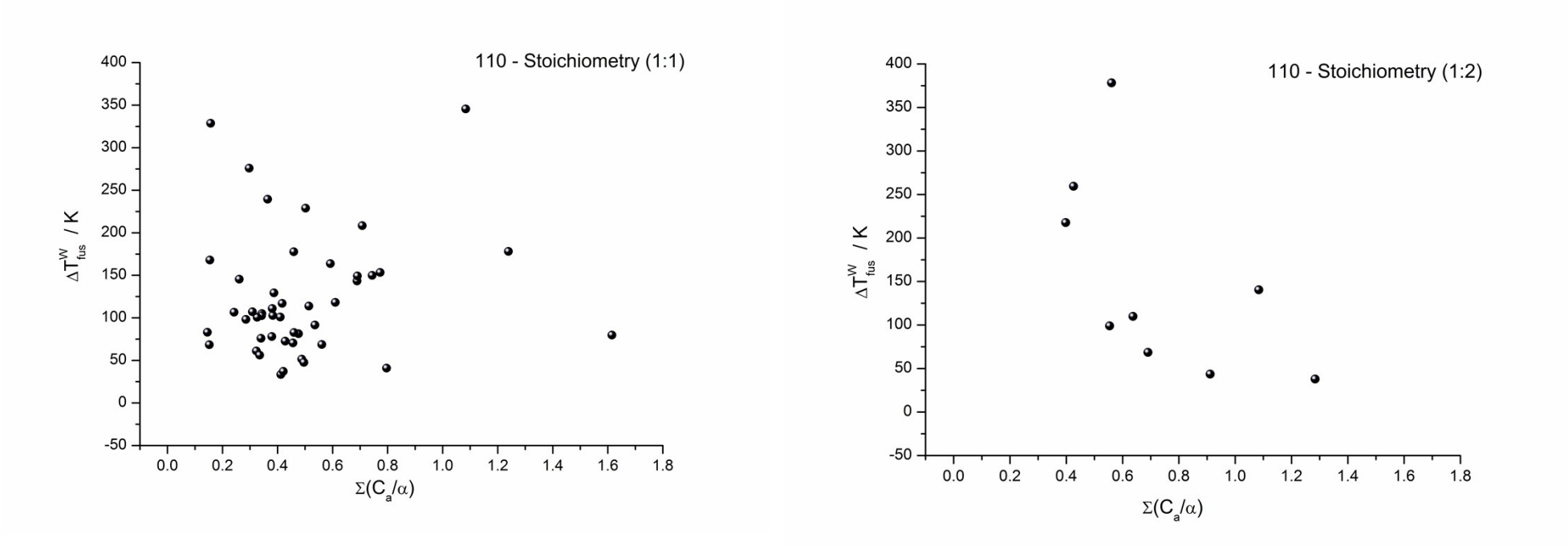
a b

Figure S1. Dependence ΔT_{fus}^{W} versus α (molecular polarizability for CF1). ΔT_{fus}^{W}-values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



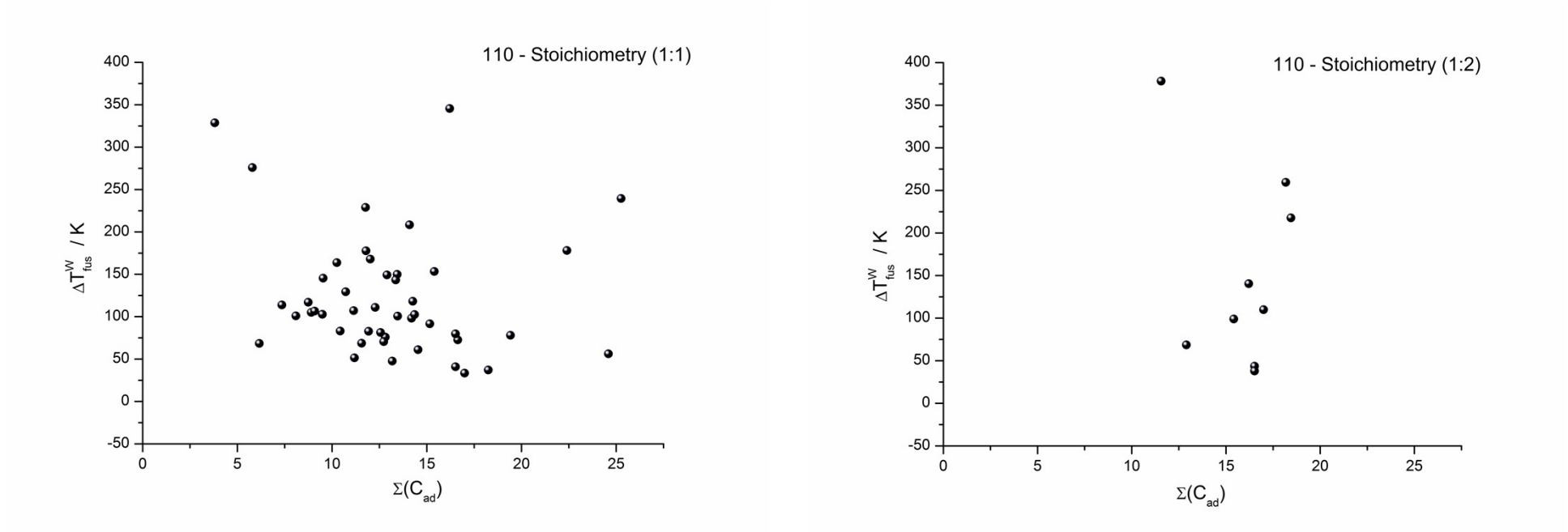
a b

Figure S2. Dependence ΔT^{W}_{fus} versus $\Sigma(C_a)$ (the sum of all H-bond acceptor factors in a molecule CF1). ΔT^{W}_{fus} -values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



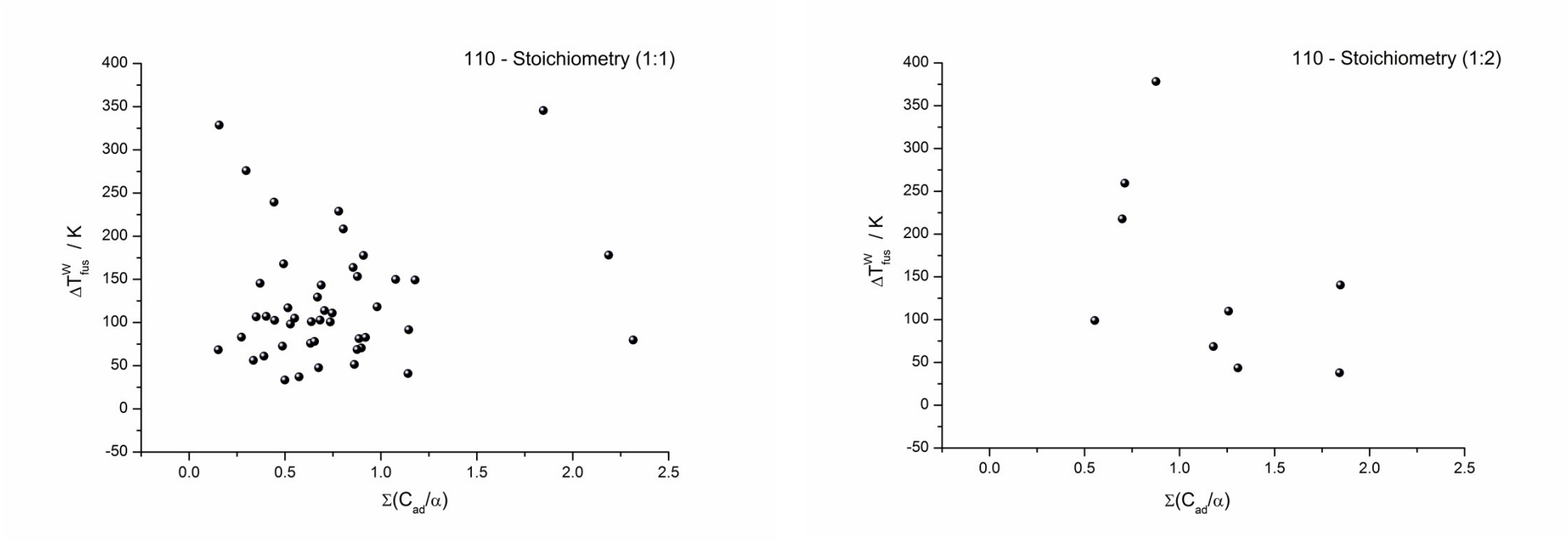
a b

Figure S3. Dependence ΔT_{fus}^{W} versus $\Sigma(C_a/\alpha)$ (the sum of all H-bond acceptor factors in a molecule CF1 normalized on polarizability). ΔT_{fus}^{W}-values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



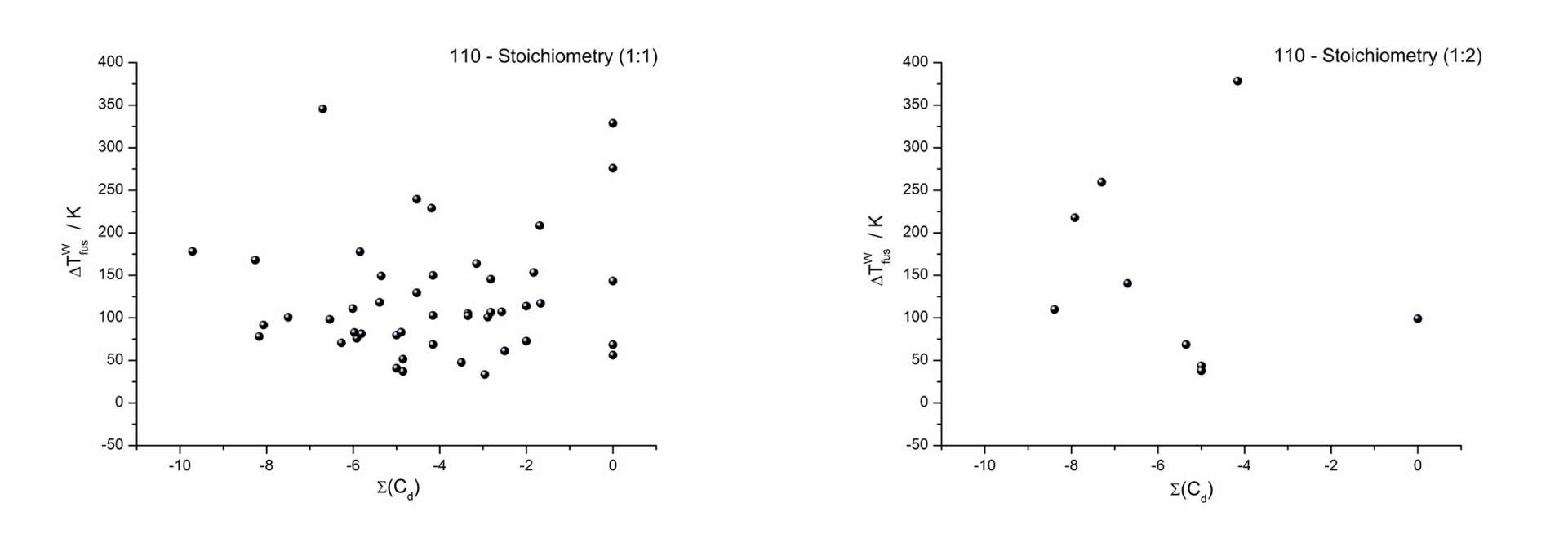
a b

Figure S4. Dependence ΔT_{fus}^{W} versus $\Sigma(C_{ad})$ (the sum of all H-bond acceptor and donor factors in a molecule CF1). ΔT_{fus}^{W}-values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



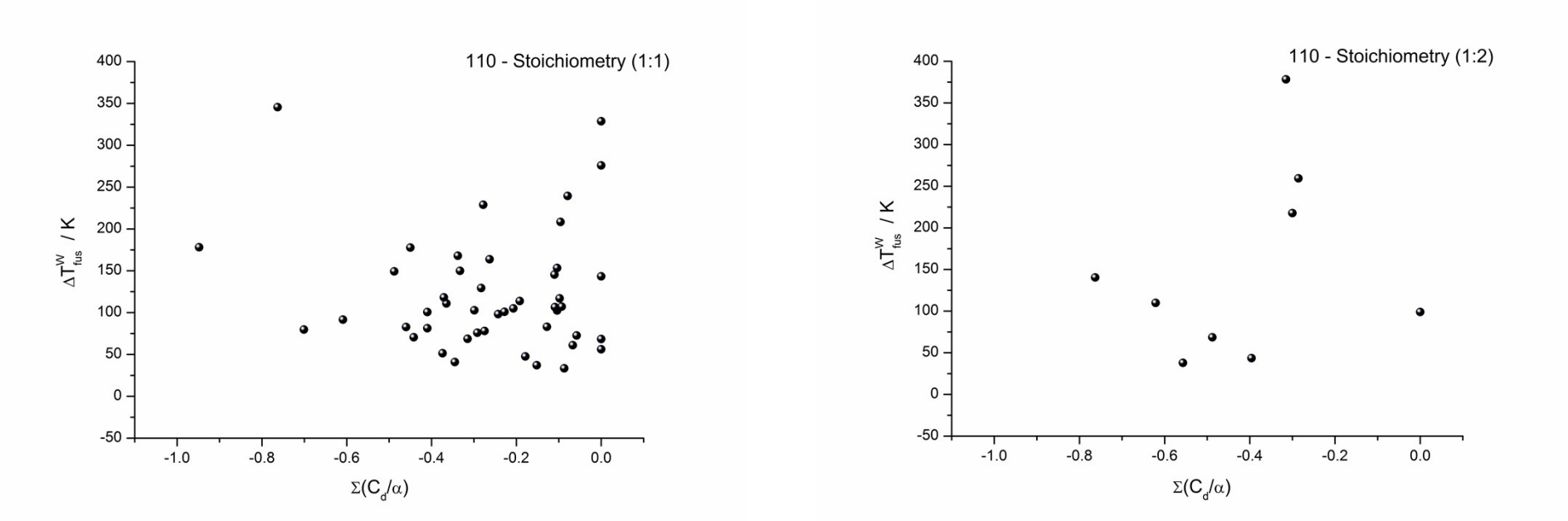
a b

Figure S5. Dependence ΔT_{fus}^{W} versus $\Sigma(C_{ad}/\alpha)$ (the sum of all H-bond acceptor and donor factors in a molecule CF1 normalized on polarizability). ΔT_{fus}^{W}-values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



a b

Figure S6. Dependence ΔT^W_{fus} versus $\Sigma(C_d)$ (the sum of all H-bond acceptor factors in a molecule CF1). ΔT^W_{fus} -values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).



a b

Figure S7. Dependence ΔT_{fus}^{W} versus $\Sigma(C_d/\alpha)$ (the sum of H-bond donor factors in a molecule CF1 normalized on polarizability). ΔT_{fus}^{W}-values correspond to (110) correlation lines location for stoichiometries (1:1) (a) and (1:2) (b).

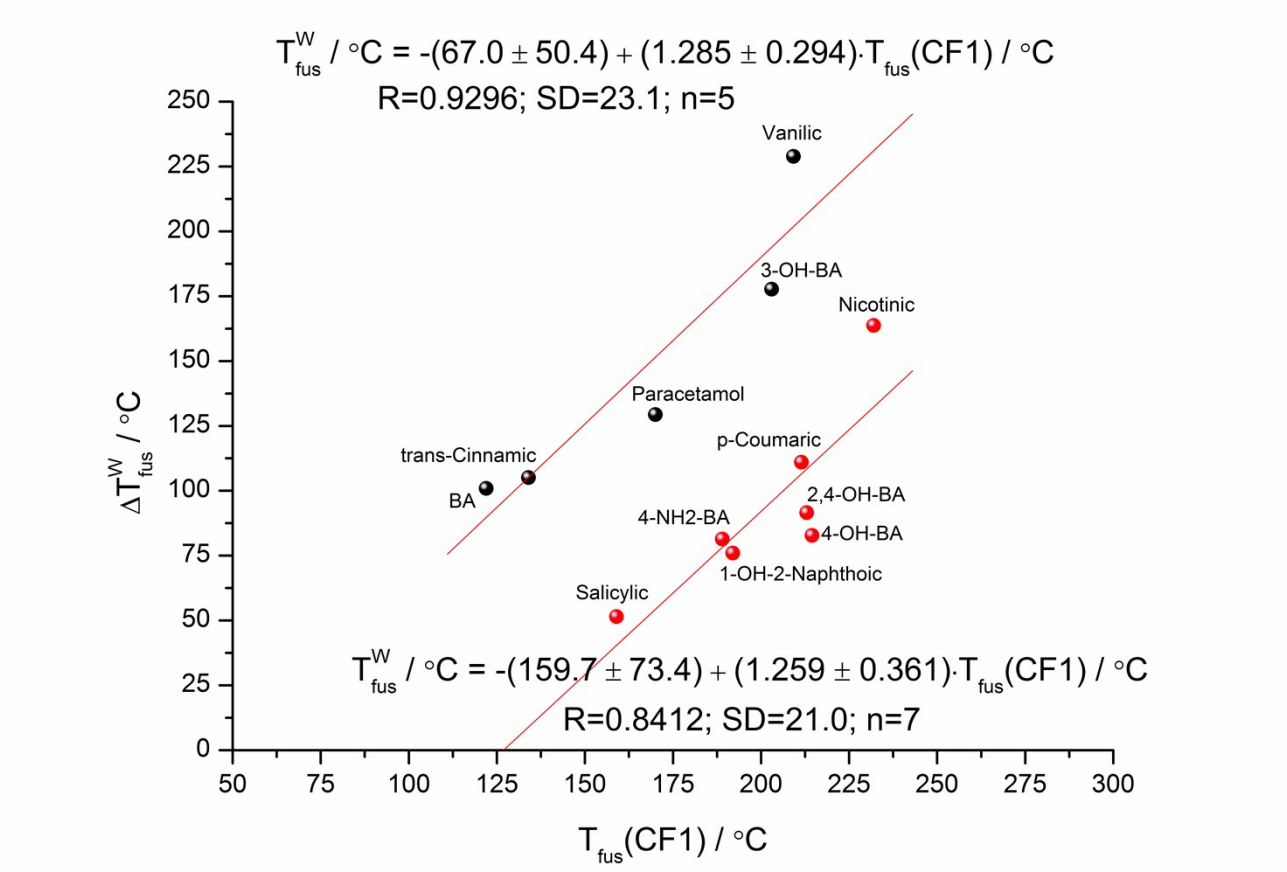


Figure S8. Dependence ΔT_{fus}^{W} versus $T_{fus}(CF1)$ for the cluster of structurally related compounds for benzoic acid.

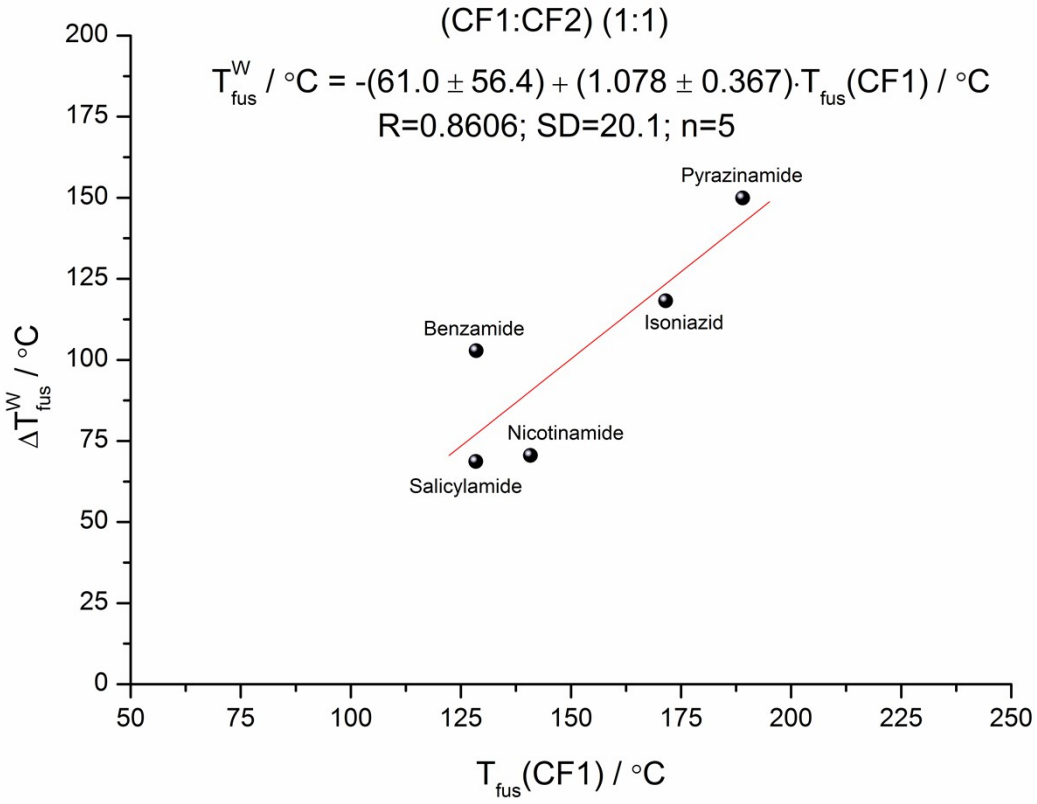


Figure S9. Dependence ΔT_{fus}^{W} versus $T_{fus}(CF1)$ for the cluster of structurally related benzamide compounds.

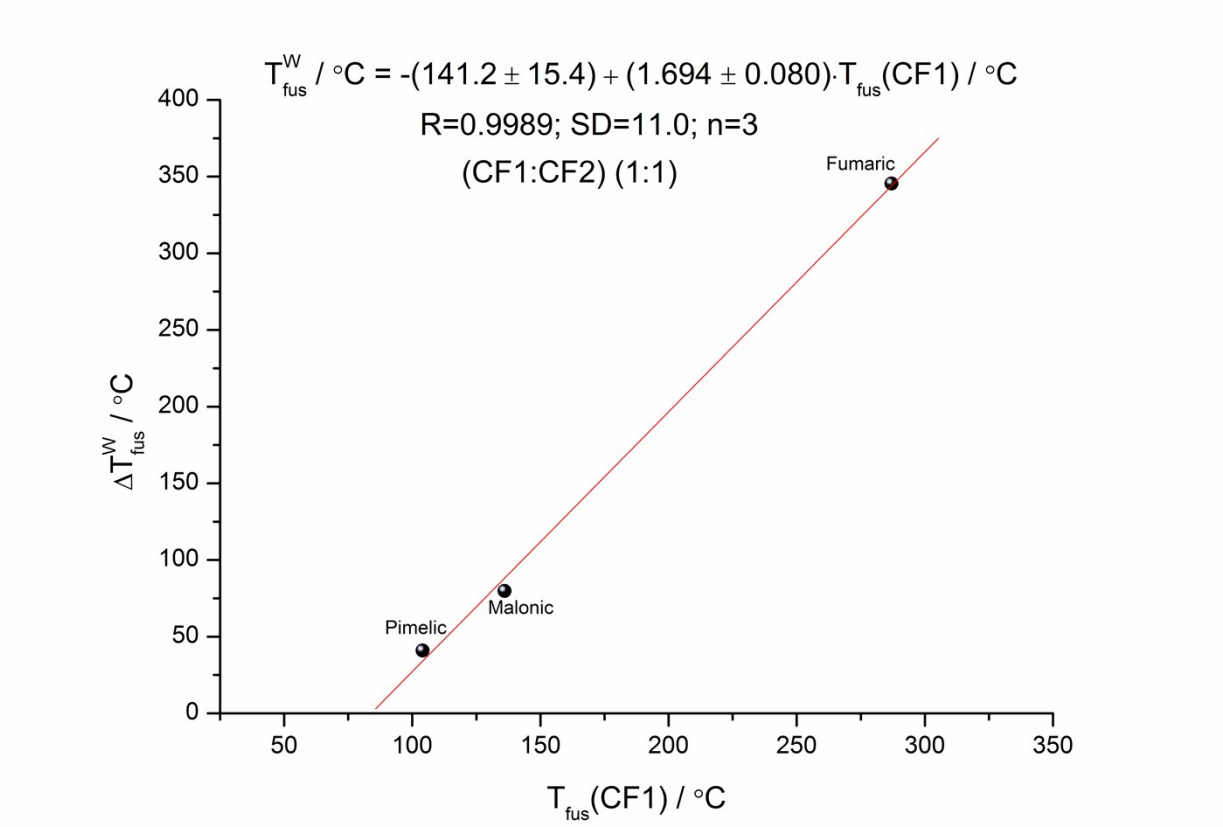


Figure S10. Dependence ΔT_{fus}^{W} versus $T_{fus}(CF1)$ for the cluster of structurally related dicarboxylic acids compounds.

Examples of the approach application

We would like to demonstrate the functionality of the proposed approach on several examples. To this end, two classes of co-crystals according to their industrial application were taken into consideration. The two-component pharmaceutical crystals belong to the most accepted class.

1. Pharmaceutical materials

a) The following example describes the simplest case. One has some kind of active pharmaceutical ingredient (API). The task is: to select the pharmaceutically suitable co-formers to obtain the co-crystals/salts with melting points lower than those of the individual components. First of all, it is necessary to check through Table S1 on the availability of this API in the list of the compounds for which the correlation equations have been obtained. If the API is presented in Table S1, the indexes (LBH) should be analyzed. In case of (010) and (011) it is impossible to produce the two-component crystal meeting the conditions for the melting point at all choice of the second component. As opposed in the case of (110) it is possible to realize the required condition by the estimation of T_{fus}^{E} and T_{fus}^{F} temperatures (Figure 1a). Considering Imatinib mesylate ($T_{fus}(API)$=218.6 °C) for which T_{fus}^{E}=181.4 °C and T_{fus}^{F}=420.9 °C as an example (Table S1), evidently, there is a large "window" (T_{fus}^{W}=239.5 °C) for the melting temperatures of the second component. Therefore, it is easy to choose the suitable candidates matching the condition: $T_{fus}^{E} < T_{fus}(CF) < T_{fus}^{F}$. The following compounds can be used as the second component: dicarboxylic acids (oxalic, fumaric and succinic), benzoic acid derivatives such as 4-OH-Benzoic Acid (BA); 3,4-OH-BA; 3,5-OH-BA; 3,4,5-OH-BA, and so on. The data on the co-crystal with Syringic Acid are given in the literature [1]: $T_{fus}(CC) = 157°C < T_{fus}(SyringicAcid) = 207.0°C < T_{fus}(API) = 218.6°C$. In addition, the drugs (Meloxicam, Theophylline, Mefenamic Acid and so on) or the physiologically active substances (Naringenin, Myricetin, Luteolin) also can stand as the second component. For example, Veverka et al. [2] described the co-crystal with Quercetin: $T_{fus}(CC) = 135.0°C < T_{fus}(API) = 218.6°C < T_{fus}(Quercetin) = 321.4°C$.

b) If one didn't manage to find the correlation equation for API in Table S1, the attempts aimed at the selection of a co-former for a given API from Table S1 with (LBH) (110) set can be made. Besides this, for a given co-former the following condition should be realized: $T_{fus}^{E} < T_{fus}(API) < T_{fus}^{F}$. Nevirapine ($T_{fus}(API)$=246.5 °C) can be used as an example. As follows from Table S1, Saccharin (marked by solid) satisfies the given conditions: 174.2 < 246.5 < 291.2

°C. The literature [3] indicates that $T_{fus}(CC) = 223.0°C$ < $T_{fus}(Saccharin) = 227.9°C$ < $T_{fus}(Nevirapine) = 246.5°C$.

2. Energetic materials

Only three compounds: Benzotrifuroxan, 2,4,6-Trinitrotoluene and CL20 from the list in Table S1 belong to the energetic materials. There are two opinions in the literature concerning the synthetic strategy of the two-component crystals. Some authors hold the idea of increasing the melting temperature of cocrystals/salts in comparison with individual compounds which allows to improve the storage safety of highly explosive materials. Another stand for the opposite course - production of co-crystals/salts with the melting temperatures lower than those of the individual components. In this case the storage safety decreases but the reliability and efficacy of explosion increase. Each of the three compounds demonstrates different possibilities in terms of the design of the two-component crystals with given melting points. 2,4,6-Trinitrotoluene belongs to class (010), so it is impossible to obtain the co-crystals/salts with melting points above/below the melting points of the individual compounds. Benzotrifuroxan refers to class (011), so the co-crystals/salts with the melting points below those of the individual compounds cannot be obtained. In its turn, CL20 is a member of class (110) (regardless of the stoichiometric composition), so it is impossible to obtain the co-crystals/salts with the melting points higher than the melting points of the individual compounds (within those stoichiometric compositions for which the correlation equations have been derived).

Let's consider the co-crystals/salts based on Benzotrifuroxan ($T_{fus}(CF1)$=197.4 °C). In order to produce the co-crystal with the melting point higher than those of the individual compounds it is necessary to select the second co-former (CF2). To this end, the melting temperature of the second component should be in the following range (Table S1): $166.4°C < T_{fus}(CF2) < 234.5°C$. For example, 2,4,6-trinitroaniline ($T_{fus}(CF2)$=184.2 °C) can be the second component. Zhang et al. [4] described such two-component crystal: $T_{fus}(2,4,6-Trinitroaniline) = 184.2°C$ < $T_{fus}(Benzotrifuroxan) = 197.4°C$ < $T_{fus}(CC) = 205.8°C$.

Let's consider the co-crystals/salts based on CL20 ($T_{fus}(CF1)$=244.0°C) with (1:2) (CL20:CF2) stoichiometry. In order to obtain the cocrystal/salt with the melting point lower than the melting points of the individual components, the second co-former (CF2) should be chosen. For this, the melting temperature of the second component should be in the following interval (Table S1): $170.4°C < T_{fus}(CF2) < 269.4°C$. For example, 4-methyl-5-nitroimidazole ($T_{fus}(CF2)$=249.0

°C) can serve as the second component. Such two-component crystal $T_{fus}(CC) = 221.0°C$ < $T_{fus}(4-methyl-5-nitroimidazole) = 249.0°C$ < $T_{fus}(CL20) = 244°C$ is described in the literature [5].

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