Electronic Supplementary Material (ESI) for CrystEngComm.

Modulating the solubility of Sulfacetamide by means of cocrystals†

N. Rajesh Goud, Ronaq Ali Khan, and Ashwini Nangia*
School of Chemistry, University of Hyderabad, Prof. C. R. Rao Road, Gachibowli, Central University P.O., Hyderabad 500 046, India
ashwini.nangia@gmail.com

Electronic Supplementary Information†

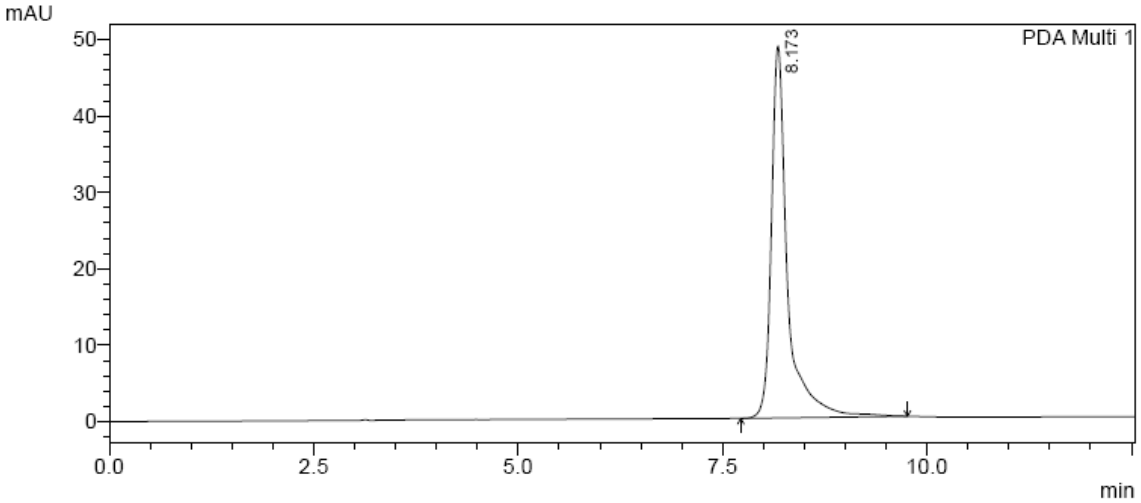


Fig. S1a pH 7 phosphate buffer test solution of SACT in 85:15 ratio of water with 1% acetic acid: Methanol mobile phase shows elution at 8.2 min in HPLC.

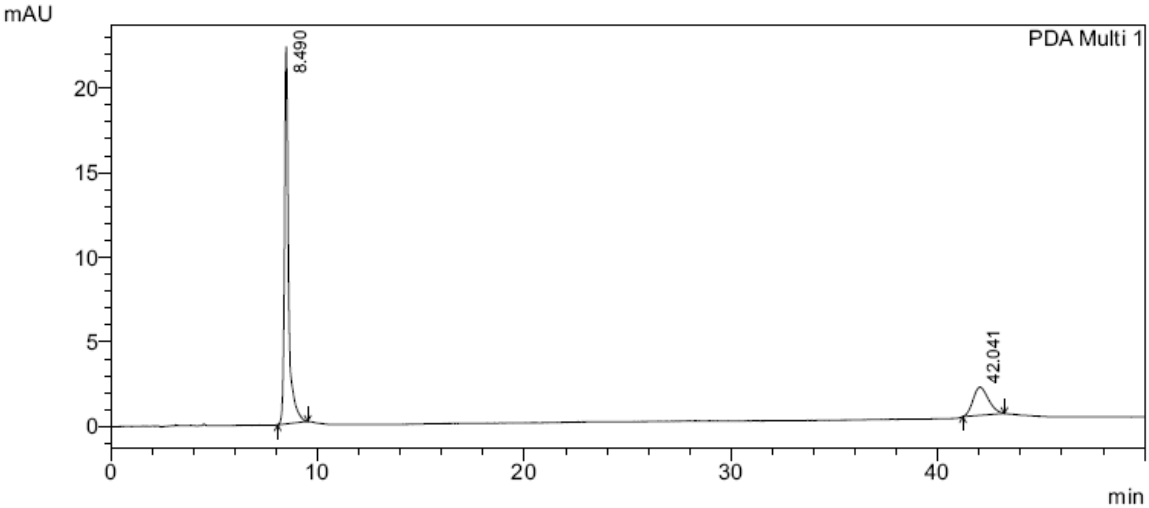


Fig. S1b pH 7 phosphate buffer test solution of SACT-CAF cocrystal in 85:15 ratio of water with 1% acetic acid: Methanol mobile phase shows elution at 8.4 min and 42.0 min for SACT and CAF respectively in HPLC.

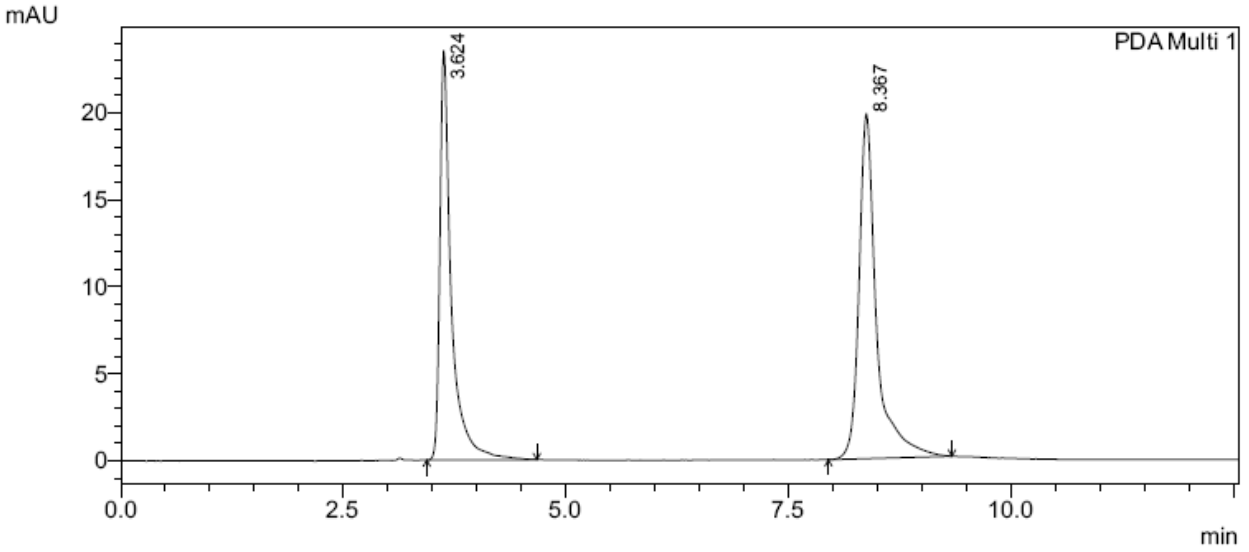


Fig. S1c pH 7 phosphate buffer test solution of SACT-INIC cocrystal in 85:15 ratio of water with 1% acetic acid: Methanol mobile phase shows elution at 3.6 min and 8.3 min for INIC and SACT respectively in HPLC.

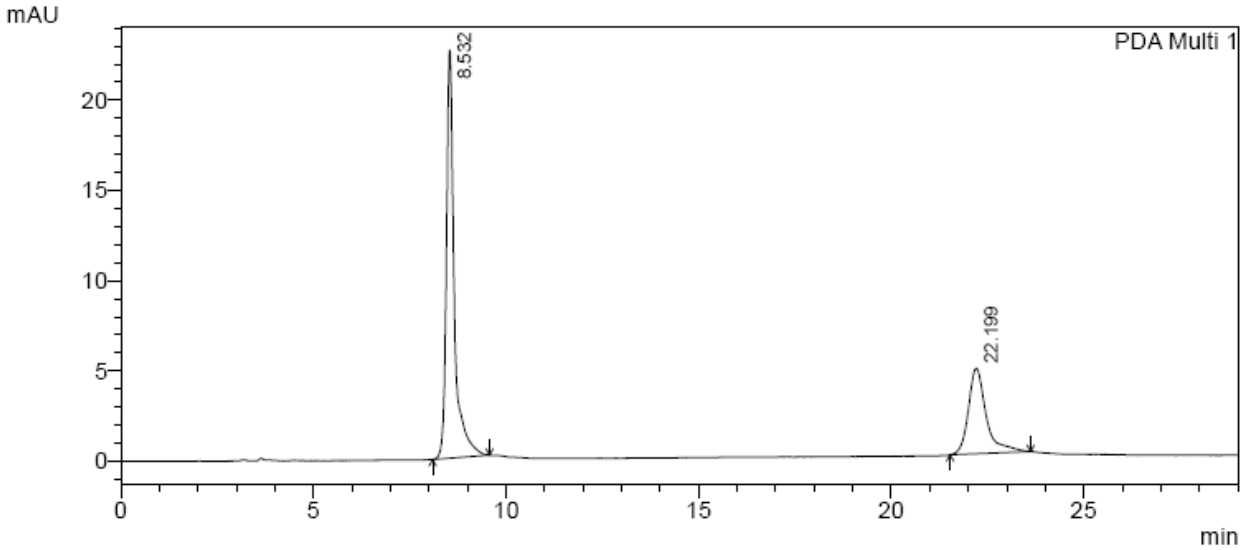


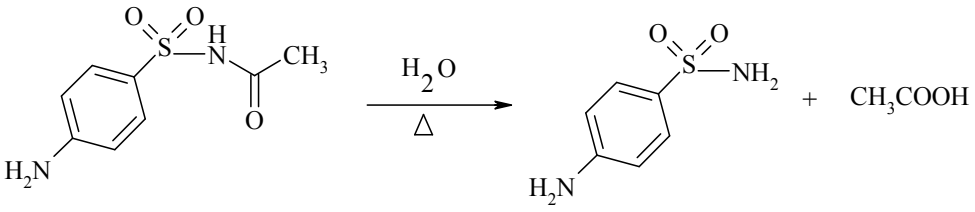
Fig. S1d pH 7 phosphate buffer test solution of SACT-THEO cocrystal in 85:15 ratio of water with 1% acetic acid: Methanol mobile phase shows elution at 8.5 min and 22.2 min for SACT and THEO respectively in HPLC.

Table S1 List of compounds used to form cocrystals with SACT.

4-Hydroxybenzoic acid	Hydroquinone	Theophylline
Benzamide	Isonicotinic acid	4-Amino Pyridine
4-Methoxybenzoic acid	Nicotinic acid	Thymine

4-nitrobenzoic acid	Isonicotinamide	Urea
Cytosine	Resorcinol	Vanillin
Malonamide	Catechol	Salicylamide
Oxalic acid	4,4′-bipyridine	Succinamide
2,4-dihydroxy benzoic acid	Caffeine	Vanillic acid
Succinic acid	Adipic acid	Glutaric acid
3,5-dihydroxy benzoic acid	Malonic acid	Fumaric acid

Apart from caffeine, theophylline, 4-aminopyridine, isonicotinamide and 4,4′-bipyridine all the other coformers were unsuccessful in making cocrystals with SACT.



Sulfacetamide Sulfanilamide Acetic Acid

Scheme S1 Hydrolytic degradation of sulfacetamide to sulfanilamide and acetic acid upon heating.

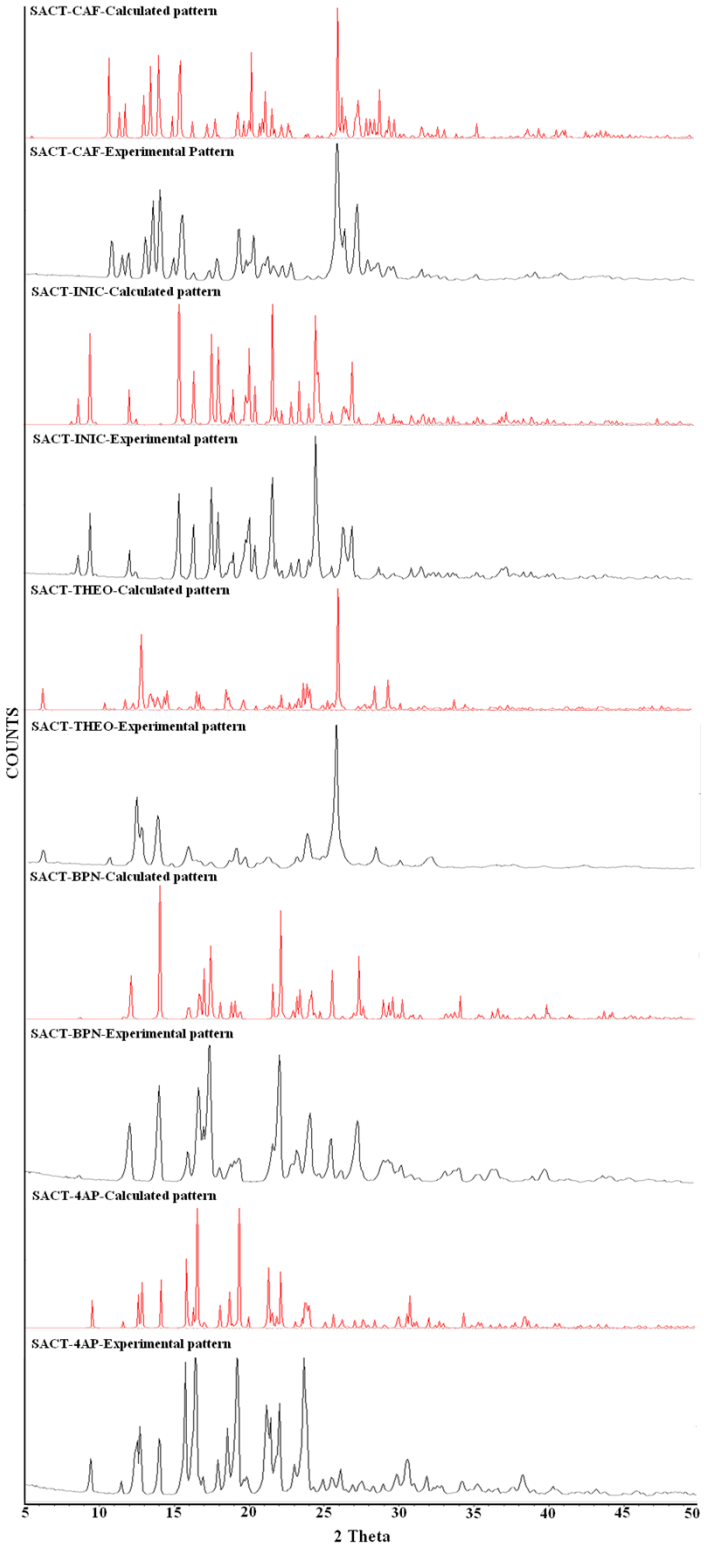


Fig. S2 Experimental PXRD pattern of SACT cocrystals bulk material showed very good match with the calculated diffraction line pattern.

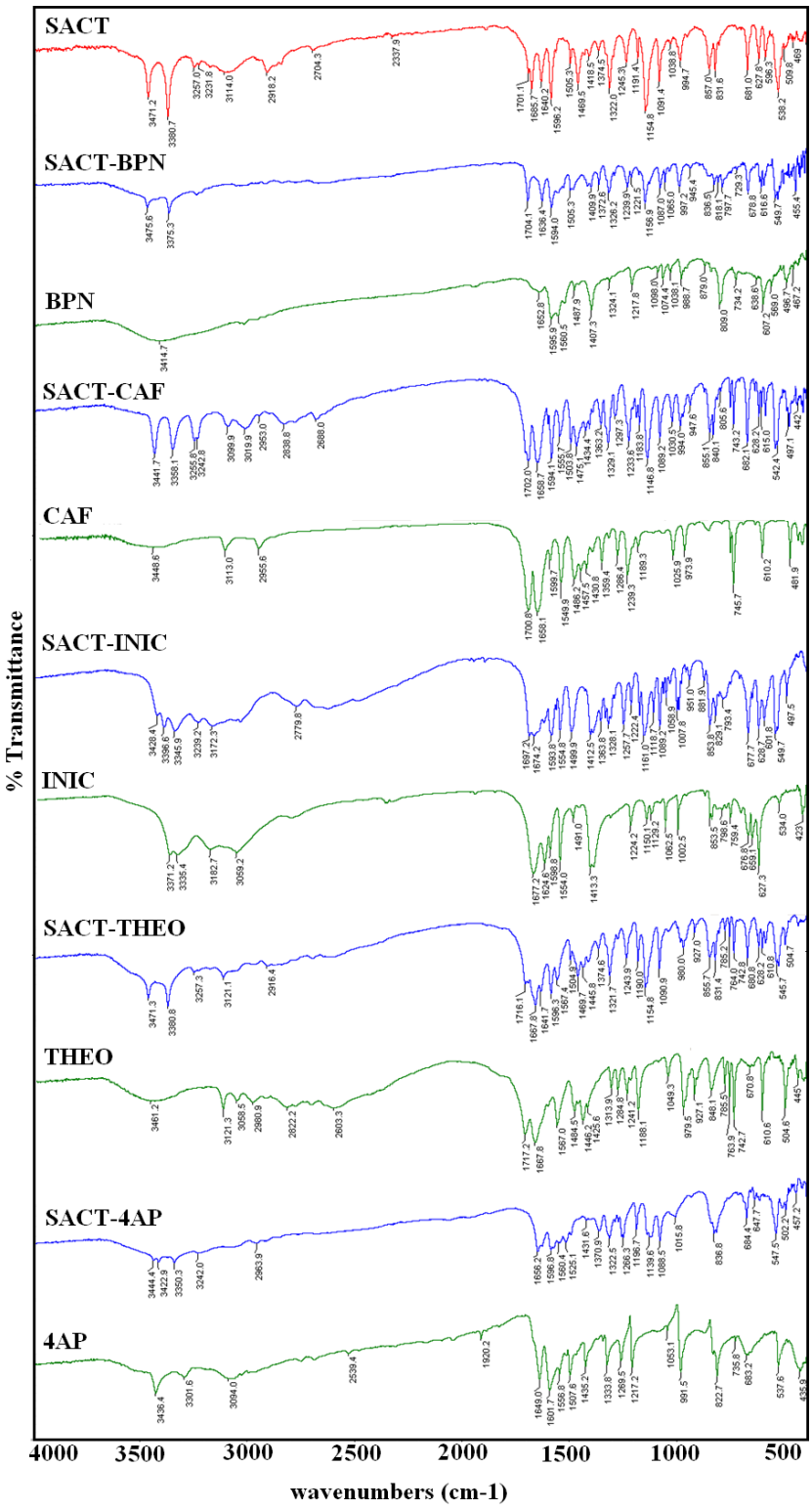


Fig. S3 IR spectra of SACT cocrystals in comparison to their starting materials.

Table S2 Major FT-IR vibrational frequencies of (ν_s, cm^{-1}) SACT cocrystals.

	N–H stretch	C=O stretch	N–H bend	C=N stretch
SACT	3471.2, 3380.7, 3257.0	1685.7	1596.2	–
BPN	–	–	–	1407.3
SACT–BPN	3475.6, 3375.3	1704.1	1594.0	1409.9
CAF	–	1700.8	–	–
SACT–CAF	3441.7, 3358.1, 3255.8	1702.0, 1658.7	1594.1	–
INIC	3371.2, 3335.4	1677.2	1554.0	–
SACT–INIC	3428.4, 3396.6, 3345.9, 3239.2	1748.0	1593.8, 1554.0	–
THEO	3461.2	1717.2, 1667.8	1567.0	–
SACT–THEO	3471.3, 3380.8, 3257.3	1716.1, 1667.8	1596.3, 1567.4	–
4AP	3436.4, 3301.6	–	1601.7	–
SACT–4AP	3444.2, 3422.9, 3350.3, 3242.0	1656.2	1596.8	–

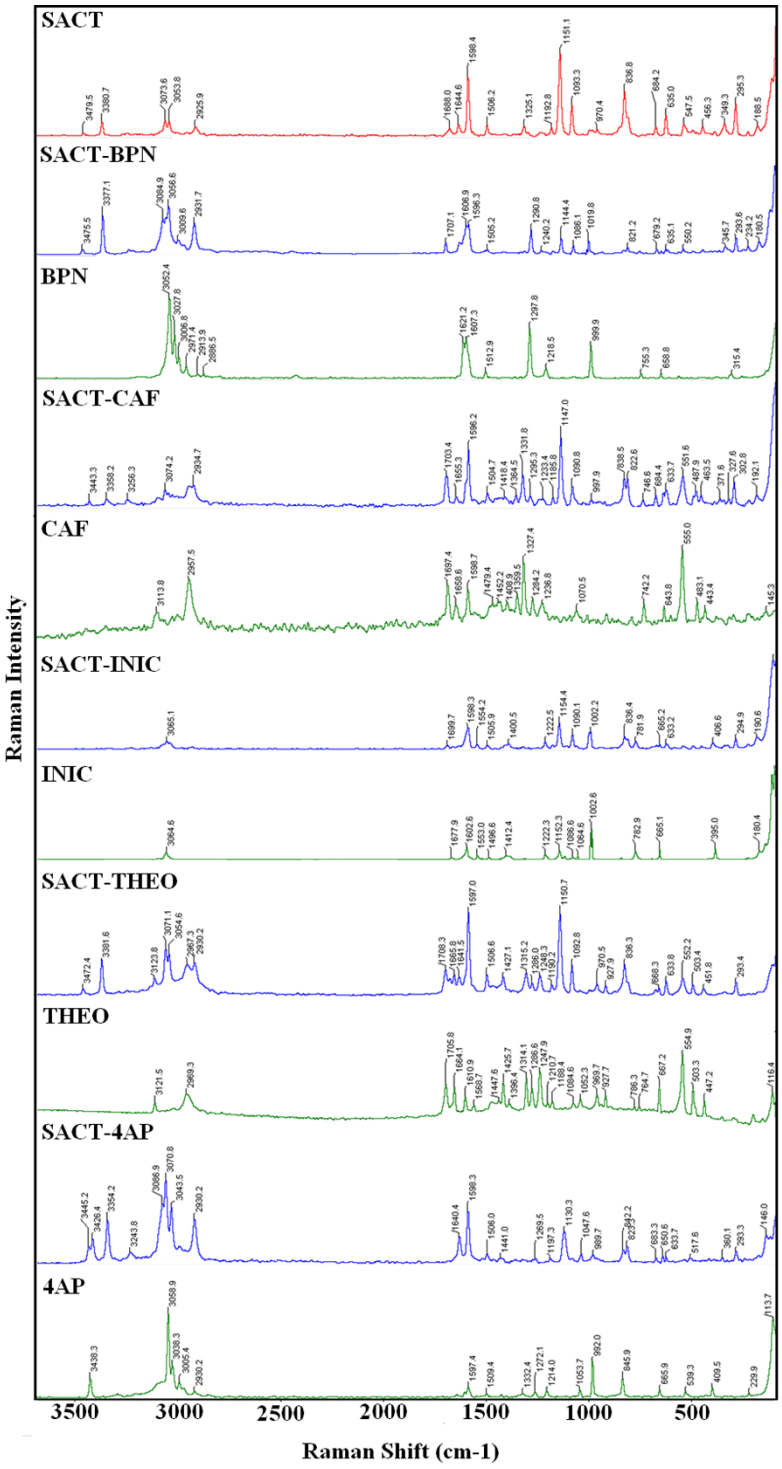


Fig. S4 Raman spectra of SACT cocrystals in comparison to their starting materials.

Table S3 Major FT-Raman vibrational frequencies of (ν_s, cm^{-1}) SACT cocrystals.

	N-H stretch	C=O stretch	N-H bend	C=N stretch
SACT	3479.5, 3380.7	1688.0	1598.4	–
BPN	–	–	–	1506.2
SACT–BPN	3475.5, 3377.1	1707.1	1596.3	1505.2
CAF	–	1697.4	–	–
SACT–CAF	3443.3, 3358.2, 3256.3	1703.4	1596.2	–
INIC	–	–	1602.2	–
SACT–INIC	–	1699.7	1598.3	–
THEO	3288.2	1705.8,1664.1	1610.9	–
SACT–THEO	3472.4, 3381.6	1708.3	1597.0	–
4AP	3438.3	–	1597.4	–
SACT–4AP	3445.2, 3426.4, 3354.2	1640.3	1598.3	–

Table S4 ss-NMR ^{13}C chemical shifts (δ, ppm) of SACT cocrystals.

SACT–BPN			
Carbon	SACT	BPN	SACT-BPN
1	21.2	–	25.1
2	171.8	–	170.7
3	133.6	–	131.4
4	122.9	–	122.9
5	112.5	–	112.0
6	153.5	–	152.4
7	115.2	–	120.4
8	128.2	–	128.6
1′	–	144.1	142.3
2′	–	121.2	113.0
3′	–	149.4	147.3
SACT–CAF			
Carbon	SACT	CAF	SACT-CAF
1	21.2	–	24.6
2	171.8	–	171.2
3	133.6	–	133.2
4	122.9	–	123.1
5	112.5	–	111.3

6	153.5	–	153.8
7	115.2	–	112.5
8	128.2	–	128.2
1′	–	32.9	28.3
2′	–	33.5	30.1
3′	–	35.8	31.4
4′	–	152.3	146.3
5′	–	155.7	152.1
6′	–	147.3	142.8
7′	–	110.4	108.0
8′	–	148.4	142.8
SACT–INIC			
Carbon	SACT	INIC	SACT-INIC
1	21.2	–	22.5
2	171.8	–	170.5
3	133.6	–	139.4
4	122.9	–	129.6
5	112.5	–	112.5
6	153.5	–	143.0
7	115.2	–	120.1
8	128.2	–	133.2
1′	–	175.4	167.4
2′	–	145.9	147.4, 149.2
3′	–	125.8	122.5, 124.3
4′	–	158.1	150.7, 153.9
SACT–THEO			
Carbon	SACT	THEO	SACT-THEO
1	21.2	–	21.5
2	171.8	–	171.3
3	133.6	–	133.7
4	122.9	–	123.1
5	112.5	–	112.7
6	153.5	–	154.3
7	115.2	–	115.4
8	128.2	–	128.4
1′	–	29.7	29.6
2′	–	29.7	29.6
3′	–	145.7	145.6

4′	–	150.5	150.4
5′	–	105.5	105.5
6′	–	154.7	154.3
7′	–	140.5	140.4
SACT–4AP			
Carbon	SACT	4AP	SACT-4AP
1	21.2	–	27.7
2	171.8	–	180.5
3	133.6	–	130.5
4	122.9	–	116.9
5	112.5	–	108.3
6	153.5	–	159.9
7	115.2	–	110.9
8	128.2	–	128.9
1′	–	154.0	152.4
2′	–	109.8	107.1
3′	–	150.8	140.9

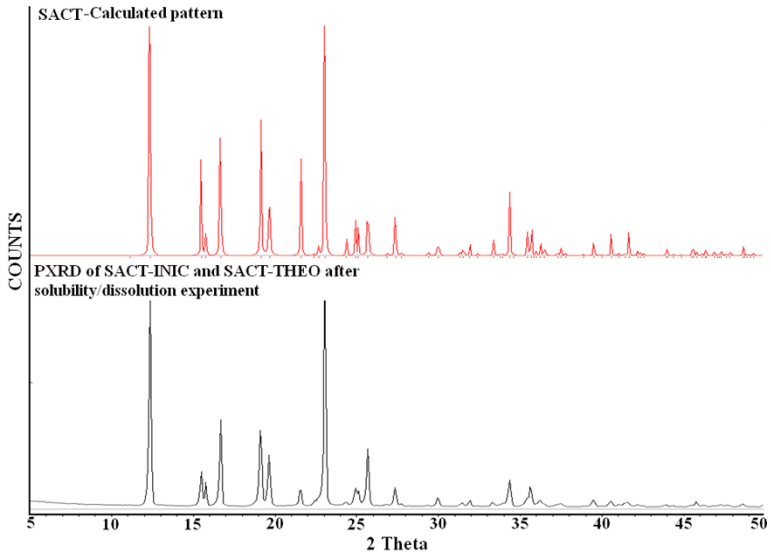


Fig. S5a PXRD pattern of SACT-INIC and SACT–THEO at the end of the solubility/ dissolution experiment match with the calculated pattern of pure SACT indicating phase conversion.

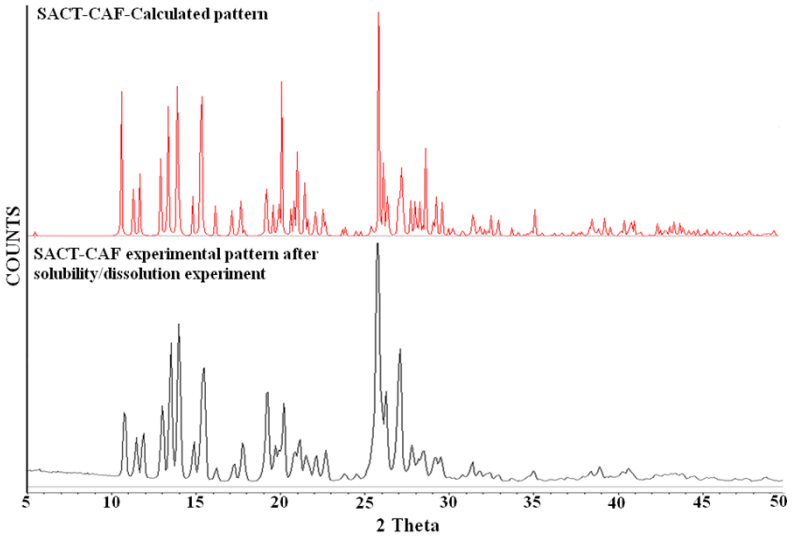


Fig. S5b PXRD pattern of SACT–CAF at the end of the solubility/ dissolution experiment match with the calculated pattern of pure SACT–CAF cocrystal indicating phase stability.