

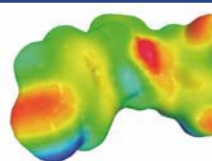
Feature summary:

- Cocrystalization screening
- Water / micelle partition
- Solubility screening for solvents, cosolvents and solvent mixtures
- Absolute solubility prediction by reference solubility
- Partition between complex mixtures, binary ternary and higher
- pKa prediction, zwitter-ion prediction
- Liquid phase behavior, activities, excess properties, ...

Related products:

- **COSMObase**: A general compound database of precalculated COSMO files for over 7000 common compounds and solvents including their most important conformations, saves time over creating your own COSMO files.
- **COSMOmic**: Prediction of water / micelle partition, distribution of actives in membranes and micelles and free energy barrier in membranes.
- **COSMOfrag**: A fast approximation to COSMOtherm for high throughput screening. Applicable to cocrystalization and solvent screening.

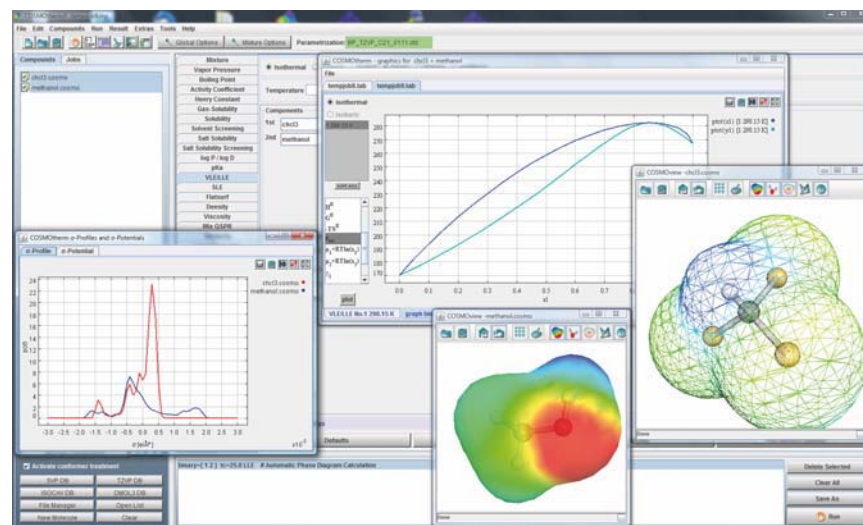
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COSMOtherm

Improving Solubility



www.cosmologic.de

Coformer	ΔH_{ex}	Coformer	ΔH_{ex}	Coformer	ΔH_{ex}	Coformer	ΔH_{ex}	Coformer	ΔH_{ex}
M	-4.1	M	-3.7	J	-3.7	J	-3.6	M	-2.9
N	-3.7	N	-3.4	H	-3.3	H	-3.3	N	-2.6
L	-3.4	L	-3.1	I	-3.2	I	-3.2	L	-2.3
K	-2.5	K	-2.2	G	-3.1	G	-3.1	J	-1.7
D	-1.6	D	-1.4	A	-1.5	A	-1.6	K	-1.6
C	-1.5	C	-1.3	B	-1.3	B	-1.4	H	-1.4
O	-0.6	G	-0.6	E	-0.8	E	-0.9	G	-1.3
G	-0.5	J	-0.5	R	-0.8	R	-0.8	I	-1.3
P	-0.4	H	-0.4	S	-0.7	S	-0.8	D	-0.9
Q	-0.4	O	-0.4	M	-0.1	M	-0.1		
J	-0.4			N	-0.1				
H				P	0.0				
				O	0.0				

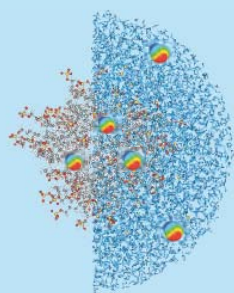
Cocrystallization screening

Initial tests give superior results to current state-of-the-art method¹: only 2 false positive results with COSMOtherm versus 6 in literature

[1] Hunter et al., *Chem. Sci.* 2011, 2, 883–890

Cocrystallization screening

- Takes advantage of the full COSMO-RS interaction scheme
- Excess enthalpy defines how much more the binary crystal is preferred over two pure crystals
- Ready to use!
- Very fast



Micelle water partition

Membrane penetration barrier

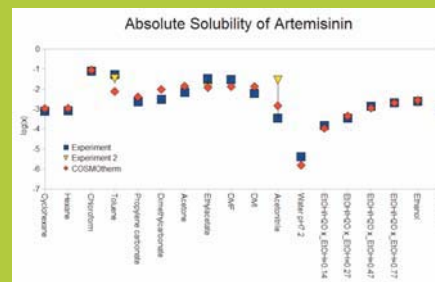
Active compound distribution

Micelle water partition

- Predicting solubility in micellar phases
- Where is your active compound: micelle solvent partition
- Free energy barrier for membrane penetration

Solubility

By screening possible solvents the development process can be significantly accelerated and experimental cost will be reduced. The reference solubility option allows for precise absolute predictions with only a single and usually easily accessible measurement.



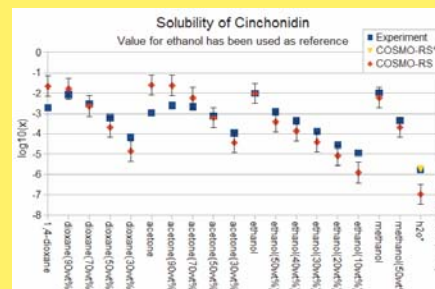
Solvent screening

Reference solubility

Temperature dependence

Applicable to mixtures

One of the main strength of COSMOtherm is the applicability to binary, ternary and even more complex mixtures without loss of accuracy. Complex mixtures are rarely used in practice, because solvent screening is experimentally not viable in this respect. A fast computer approach, however, is as easy to do for mixtures as for solids.



Mixture solubility

Binary, ternary and higher

No loss of accuracy