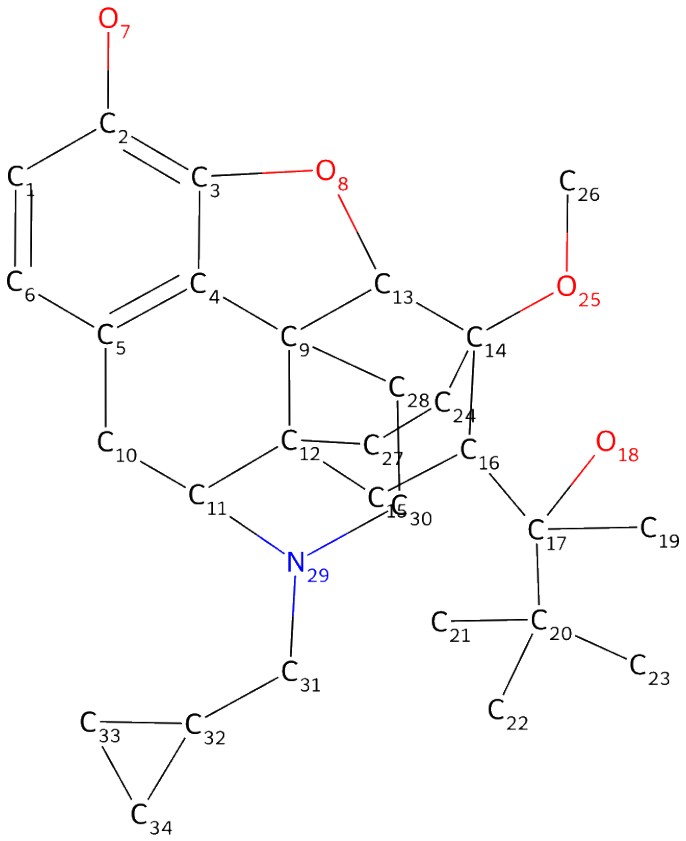
C-oxidation BDE Energy Report for: 073_buprenorphine-out

This report covers the results for bond dissociation enthalpies (BDE) and solvent accessible surface area (SASA) calculations performed for 073_buprenorphine-out. Oxidation propensity is established using C-H BDE. The lower the C-H BDE values the higher the propensity for C-oxidation. Details for the density functional theory (DFT) calculations and overall workflow are explained at the end of this document.

BDE and SASA



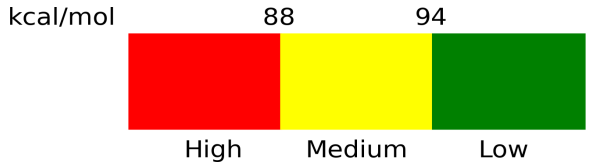
Atom	BDE (kcal/mol)	Propensity	SASA (Å²)
C1	113.99	Low	15.46
C6	112.43	Low	10.70
C10	83.54	High	0.45
C11	97.18	Low	0.00
C13	97.72	Low	0.00
C15	94.65	Low	0.00

C16	83.74	High	0.00
C19	100.64	Low	3.98
C21	100.95	Low	4.35
C22	98.59	Low	3.65
C23	98.92	Low	3.41
C24	94.02	Low	0.93
C26	96.54	Low	7.16
C27	94.88	Low	0.82
C28	97.46	Low	0.37
C30	89.03	Moderate	0.57
C31	86.74	High	0.03
C32	104.8	Low	0.61
C33	106.51	Low	10.78
C34	107.83	Low	11.19

Missing Sites:

None

Risk Scale:



Calculation Details

Conformational search calculations were performed only for the base ground state molecule. The lowest energy conformer was selected to generate radicals and run optimization DFT calculations. DFT calculations were performed using Gaussian with B3LYP level of theory and 6-31G(d,p) basis set. The BDE protocol was adapted from: *Lienard, P., Gavartin, J., Boccardi, G., & Meunier, M. (2015). Predicting drug substances autoxidation. Pharmaceutical research, 32, 300-310.*