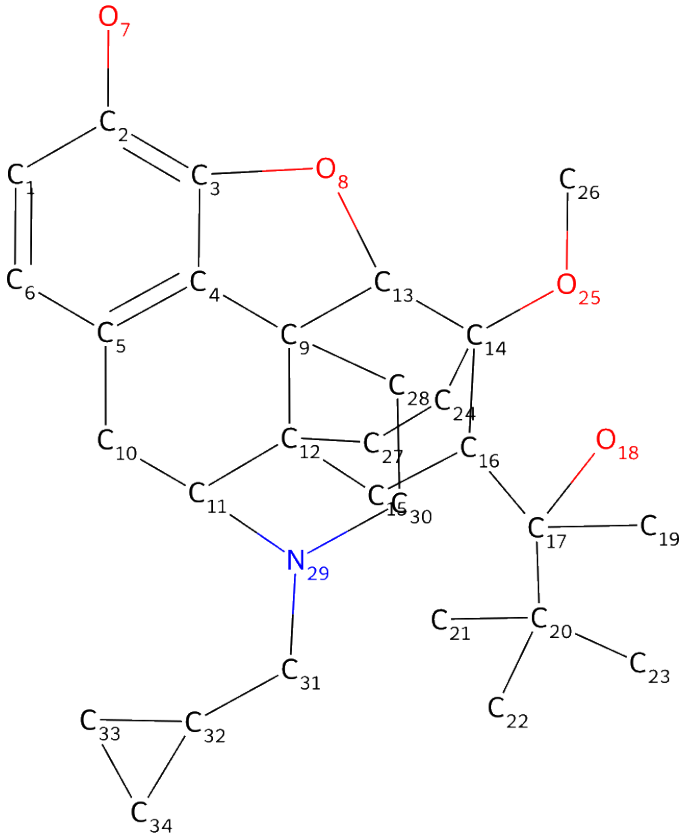
C-oxidation BDE Energy Report for: 073_buprenorphine-out

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



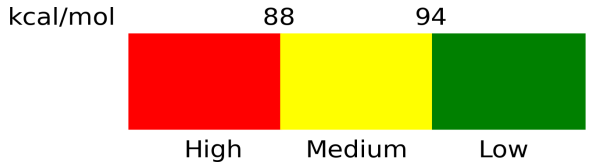
Atom	BDE (kcal/mol)	Propensity
C1	113.99	Low
C6	112.43	Low
C10	83.54	High
C11	97.18	Low
C13	97.72	Low
C15	94.65	Low

C16	83.74	High
C19	100.64	Low
C21	100.95	Low
C22	98.59	Low
C23	98.92	Low
C24	94.02	Low
C26	96.54	Low
C27	94.88	Low
C28	97.46	Low
C30	89.03	Moderate
C31	86.74	High
C32	104.8	Low
C33	106.51	Low
C34	107.83	Low

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.*