TABLE 1. *Typical entropy and free-energy contributions from translations, rotations, and vibrations at 298°K*

Motion		$S°$ (cal deg^{-1} mol^{-1})	$H°-H_0°$ (kcal mol^{-1})	$G°-H_0°$ (kcal mol^{-1})
Three degrees of translational freedom for molecular weights 20–200, standard state 1 M [a]		29–36	1.48	−7.2 to −9.1
Three degrees of rotational freedom [a]	Moments of inertia[b]			
Water	5.8×10^{-120}	10.5[c]	0.89	−2.24
n-Propane	5.0×10^{-116}	21.5[c]	0.89	−5.53
endo-Dicyclopentadiene	3.8×10^{-113}	27.2[c]	0.89	−7.21
Internal rotation[d]		3–5	0.3[e]	−0.6 to −1.2
Vibrations[a]	ω, cm^{-1}			
	1000	0.1	0.03	0.0
	800	0.2	0.05	−0.01
	400	1.0	0.20	−0.10
	200	2.2	0.35	−0.31
	100	3.4	0.46	−0.56

[a] Calculated from standard equations for translation (Sackur–Tetrode equation), rotation (rigid rotator), and vibration (assuming a harmonic oscillator) in the gas phase; see for example, Pitzer, K. S., and L. Brewer, *Thermodynamics* (McGraw-Hill Book Co., Inc., New York, 1961).

[b] Product of three principal moments of inertia, g^3 cm^6.

[c] Symmetry corrected. [d] See text.

[e] Typical value; this quantity is a function of the barrier to rotation and the partition function.