Table 2. Values of Gibbs Energy of Reaction, $\Delta G_r$, (J per gram of cells) at 250 bar[a]

| Cell Constituent | Amount mg·(g cells)$^{-1}$ | $\Delta G_r$ (J per gram of cells) | | | | |
|---|---|---|---|---|---|---|
| | | 25 °C | 50 °C | 75 °C | 100 °C | 125 °C |
| Fatty acids | 80 | –75 | –347 | –330 | –298 | –230 |
| Nucleotides | 249 | 405 | 214 | 247 | 295 | 380 |
| Saccharides | 47 | 38 | –27 | –22 | –13 | 8 |
| Amino acids | 631 | 117 | –841 | –754 | –603 | –305 |
| Amines | 17 | 14 | –15 | –13 | –10 | –3 |
| Total | 1024 | 500 | –1016 | –873 | –628 | –150 |

[a]Summarized from values tabulated by Amend and McCollom [21]. The calculations of Amend and McCollom [21] are based on the mixing of cool, oxidized Hadean seawater (25 °C, pH 6.5, redox midpoint potential, $E_h$, –300 mV) with hot, reduced alkaline hydrothermal vent effluent (140 °C, pH 9, $E_h$, –700 mV) in endmember fluids at 250 bar. The values in the column for 25 °C are for Hadean seawater without mixing; the different temperatures result from different mixing ratios [21]. The activities of seawater $CO_2$ and hydrothermal effluent $H_2$ underlying their calculations are given in Table 1 of Amend and McCollom [21] as 22.1 and 16 mmol kg$^{-1}$, respectively. The $O_2$ levels are assumed to be $10^{-9}$ mmol kg$^{-1}$ in seawater and 0 in Hadean hydrothermal fluid [21]. Note that oxygen levels are a crucial parameter. Amino acid synthesis and cell mass synthesis, while requiring little if any energy input or even being exergonic under strictly anoxic hydrothermal vent conditions [21], become extremely endergonic even under very mildly oxidizing conditions, such as microoxic conditions corresponding to only 0.001 of present oxygen levels [78].