Ellingham Diagrams
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Standard Gibb's Energies of Formation for
Bromides
Chlorides
Fluorides
Hydrides
Iodides
Nitrides
Oxides
Sulfides
Selenides
Tellurides

The figures include nomographs for equilibrium partial pressures.

Data sources:
1) Thomas B. Reed, Free Energy of Formation of Binary Compounds,
2) D. R. Stull and H. Prophet, JANAF Thermochemical Tables,

This is an Internet Resource for MET 320 - Metallurgical Thermodynamics.
Ellingham Diagram for Selected Bromides: Part-1


Symbols:
m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling

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Ellingham Diagram for Selected Chlorides: Part-1

Ellingham Diagram for Selected Chloride: Part-2


-0.2 -0.4 -0.6 -0.8 -1.0 -1.2 -1.4 -1.6 -1.8 -2.0 -2.2 -2.4 -2.6 -2.8 -3.0 -3.2 -3.4 -3.6 -3.8 -4.0 -4.2 -4.4 -4.6 -4.8 -5.0 -5.2 -5.4 -5.6 -5.8 -6.0 -6.2 -6.4 -6.6 -6.8 -7.0 -7.2 -7.4 -7.6 -7.8 -8.0 -8.2 -8.4 -8.6 -8.8 -9.0 -9.2 -9.4 -9.6 -9.8 -10.0 -10.2 -10.4 -10.6 -10.8 -11.0 -11.2 -11.4 -11.6 -11.8 -12.0 -12.2 -12.4 -12.6 -12.8 -13.0 -13.2 -13.4 -13.6 -13.8 -14.0

T, K

ΔGo, Kcal/gfw

Log p

m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling
Ellingham Diagram for Selected Chlorides: Part-3


- Ellingham Diagram for Selected Chlorides: Part-3
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- Elements and Compounds:
  - TaCl₅, M
  - TeCl₄, B
  - SnCl₄, Bₘ
  - TiCl₄, Bₘ
  - WCl₆, B
  - UCl₃, M
  - UCl₆, Bₘ
  - VCl₂, M
  - YCl₃, Bₘ
  - ZnCl₂, M
  - ZrCl₄, B

- Temperature Axis (T, K):

- ΔG°, Kcal/gfw (ΔG° - Free Energy Change)

- Log p

- Interpretation of Symbols:
  - m - Element Melting
  - b - Element Boiling
  - M - Compound Melting
  - B - Compound Boiling

- Temperature Ranges:
  - 0 to 2400 K
  - ΔGo, Kcal/gfw Ranges:
    - -300 to 0
    - -250 to -200
    - -200 to -150
    - -150 to -100
    - -100 to -50
    - -50 to 0
  - Log p Ranges:
    - -50 to 0
    - 0 to 5

- Additional Axis:
  - 0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
  - T, K

- Diagram Elements:
  - WCl₅
  - TeCl₄
  - SnCl₄
  - TiCl₄
  - WCl₆
  - UCl₃
  - UCl₆
  - VCl₂
  - YCl₃
  - ZnCl₂
  - ZrCl₄
  - RbCl
Ellingham Diagram for Selected Chlorides: Part-4

Ellingham Diagram for Selected Chlorides: Part-5

Ellingham Diagram for Selected Fluorides: Part-1

Ellingham Diagram for Selected Fluorides: Part-2


- Ellingham Diagram for selected fluorides.
- Symbols: m - Element Melting, b - Element Boiling, M - Compound Melting, B - Compound Boiling.

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Ellingham Diagram for Selected Fluorides: Part-3

m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling

ΔGo, Kcal/gfw vs. T, K
Ellingham Diagram for Selected Fluorides: Part-5


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m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling
Ellingham Diagram for Selected Hydrides: Part-2


- m - Element Melting
- b - Element Boiling
- M - Compound Melting
- B - Compound Boiling
Ellingham Diagram for Selected Hydrides: Part-3

Ellingham Diagram for Selected Iodides: Part-1

Ellingham Diagram for Selected Nitrides: Part-1


\[ \Delta G^\circ, \text{Kcal/gfw} \]

\[ T, \text{K} \]

- Element Melting
- Compound Melting
- Compound Boiling
- Element Boiling
Ellingham Diagram for Selected Oxides: Part-1


- ΔG°, Kcal/gfw
- T, K
- m - Element Melting
- b - Element Boiling
- M - Compound Melting
- B - Compound Boiling

Log p_i
Ellingham Diagram for Selected Oxides: Part-2

Ellingham Diagram for Selected Oxides: Part-3


- Element Melting
- Element Boiling
- Compound Melting
- Compound Boiling
Ellingham Diagram for Selected Oxides: Part-4


- \( \Delta G^0 \), Kcal/gw
- \( T, K \)
- \( \log p \)

Legend:
- \( m \) - Element Melting
- \( b \) - Element Boiling
- \( M \) - Compound Melting
- \( B \) - Compound Boiling
Ellingham Diagram for Selected Oxides: Part 6

Ellingham Diagram for Selected Oxides: Part-7

Ellingham Diagram for Selected Sulfides: Part-1

Ellingham Diagram for Selected Sulfides: Part-2


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m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling
Ellingham Diagram for Selected Sulfides: Part-3


ΔG°, Kcal/gfw

T, K

m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling
Ellingham Diagram for Selected Tellurides: Part-1

Ellingham Diagram for Selected Tellurides: Part-2


ΔGo, Kcal/gfw

T, K

m - Element Melting
b - Element Boiling
M - Compound Melting
B - Compound Boiling