Roaster Diagram

$3ZnO + 2SO_2 + O_2 = ZnO{\bullet}2ZnSO_4$ ΔG_I° =-164,400-26.32TlogT+212.30T (800-1200K)

$2(ZnO{\bullet}2ZnSO_4) + 2SO_2 + O_2 = 6ZnSO_4$ ΔG_{II}° =-128,580-11.12TlogT+142.78T (1007-1200K)

$SO_2 + 0.5O_2 = SO_3$ ΔG_{III}° =-25,010-5.56TlogT+40.52T (298-2000K)

$PT := 1$

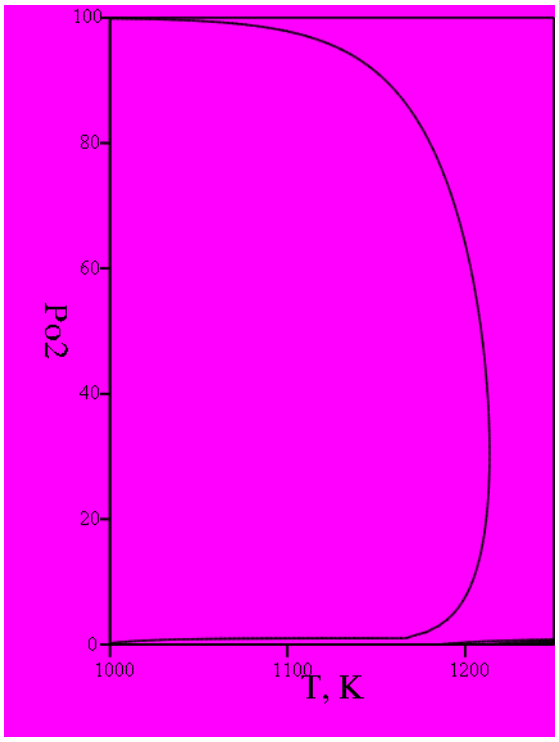
EXAMPLE

$$k1(T) := e^{\frac{-(164400+26.32\cdot T\cdot\log(T)-212.30\cdot T)\cdot 0.5}{1.987\cdot T}}$$

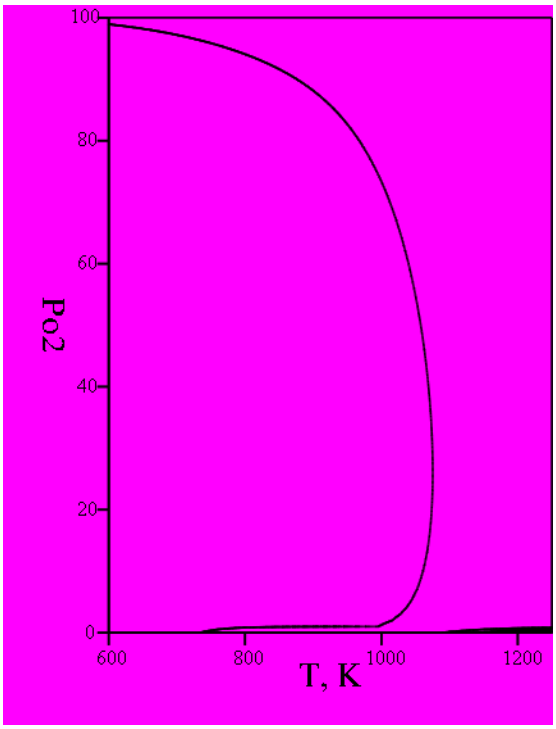
$$k2(T) := e^{\frac{-(64290+5.56\cdot T\cdot\log(T)-71.39\cdot T)\cdot 0.5}{1.987\cdot T}} \qquad k3(T) := e^{\frac{-(-25010-5.56\cdot T\cdot\log(T)+40.52\cdot T)}{1.987\cdot T}}$$

$i := 600 .. 1250$ $T_i := i$ $j := 0 .. 100$ $PO2_j := PT\cdot(0.0000001 + 0.01\cdot j)$

$$S1_{i,j} := PO2_j + k1(T_i)\cdot\left(\frac{1}{\sqrt{PO2_j}} + k3(T_i)\right) \quad S2_{i,j} := PO2_j + k2(T_i)\cdot\left(\frac{1}{\sqrt{PO2_j}} + k3(T_i)\right) - PT$$



S1



S2