1. One mole of solid silver at 950oC is added into one mole of liquid silver at 1450oC in an adiabatic container at constant pressure. When the system has attained equilibrium and there is only liquid silver.

What is the temperature? Can you discuss the feasibility of this process using the Gibbs Potential (ΔG) argument (and not entropy argument).

Given: M.P. of silver = 961oC.

Heat of fusion of silver at the melting point = 11250 J/mol.

Cp(Ag,s)  =21.3 + 8.54\*10-3T J/ mol.K; Cp(Ag,l) = 30.54 J/mol.K.





1. (CaCO3(s), CaO(s) and CO2(g) are found to be at equilibrium with each other at 1183K and 1atm. pressure. That is to say, the reaction

CaO(s) + CO2(g) = CaCO3 (s) , all pure compounds

is reversible at 1183K and 1atm. pressure. (If you increase the pressure infinitesimally, the reaction will go forward, *and vice versa.*Similar is the case if you change the temperature infinitesimally)

Calculate ΔHo and ΔSo for the reaction at 298K and 1 atm. pressure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Ho298, J/mol | Cp = a +bT + cT-2, J/mol/K | | |
| a | b x 103 ## | c x 10-5 |
| CaO(s) | -635000±2000 | 49.57 | 4.51 | -6.94 |
| CO2(g) | -394000±150 | 44.10 | 9.03 | -8.53 |
| CaCO3(s) | -1208000±3000 | 104.42 | 21.90 | -25.92 |

## When b x 103 = 4.51 in a table, b = 4.51 x 10-3.

Please note that for a reaction aA + bB = cC; ΔHo = HCo - HAo– HBo; similarly for ΔSo..

