11.5 Thermochemistry of Fuel Vaporization

11.5.1 Gas-Solid Equilibria (Rand Markin)

Look at Other Components Besides Oxygen

Hypostoichiometric Oxides

Consider $(U_{1-q}Pu_q)O_{2-x}$

$$(1-q)UO_{2.0} \; + \; qPuO_{2-m}$$

$$\text{where } m = \frac{x}{q}$$

Raoult's Law for partial pressure of UO_2 Over Solid

$$\Pi_{UO_2} = (1-q)P^{\circ}_{UO_2}$$

$$\Pi_{UO_2} = (1-q) \quad \exp\left\{\frac{-\Delta G_{UO_2,vap}}{RT}\right\}$$

$$Vapor\ \text{Pr}\ essure, of, pure, solid, UO_2$$

$$PuO_{2-m}(s) + \frac{m}{2}O_2 = PuO_2(g)$$

is the same as the sum of

$$PuO_{2-m}(s) + \frac{m}{2}O_2 = PuO_2(s)$$

and

$$PuO_2(s) = PuO_2(g)$$