

### **differential molar energy of adsorption**

When the addition of a differential amount  $dn_i^\sigma$  or  $dn_i^s$  is effected at constant gas volume, the differential molar energy of adsorption of component  $i$ ,  $\Delta_a U_i^\sigma$  or  $\Delta_a U_i^s$ , is defined as:

$$\Delta_a U_i^\sigma = U_i^\sigma - U_i^g,$$

or

$$\Delta_a U_i^s = U_i^s - U_i^g$$

where the differential molar surface excess energy,  $U_i^\sigma$ , is given by

$$U_i^\sigma = \left( \frac{\partial U^\sigma}{\partial n_i^s} \right)_{T, m, n_j^\sigma} = \left( \frac{\partial U}{\partial n_i^\sigma} \right)_{T, m, V^g, p_i, n_j^\sigma}$$

and the differential molar interfacial energy,  $U_i^s$ , by

$$\begin{aligned} U_i^s &= \left( \frac{\partial U}{\partial n_i^s} \right)_{T, m, V^g, p_i, n_j^\sigma} \\ &= \left( \frac{\partial U}{\partial n_i^s} \right)_{T, m, V^g, V^s, p_i, n_j^s} \end{aligned}$$

$U_i^g$  is the differential molar energy of component  $i$  in the gas phase, i.e.  $(\partial U / \partial n_i^g)_{T, V, n_j^g}$ .

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