$$\Delta S = -\frac{\Delta H}{T}$$

$$\Delta S = \frac{\Delta H}{T}$$

$$92.92\ \text{J/K·mol} = \frac{58.51\ \text{kJ/mol}}{T}$$

$$\frac{92.92\ \text{J}}{\text{K·mol}} = \frac{\frac{58.5\ \text{kJ}}{\text{mol}}}{T}\left(\frac{1000\ \text{J}}{1\ \text{kJ}}\right)$$

$$\frac{92.92\ \text{J}}{\text{K·mol}} = \frac{58500\ \text{J/mol}}{T}$$

$$T = \frac{58500\ \text{J}}{92.92\ \text{J/K}}$$

$$T = 629.5\ \text{K}$$

40. $2Al(s) + 3Br_2(l) \Rightarrow 2AlBr_3(s)$

$\Delta S = -144\ J/K$

$\Delta S = \sum \Delta S_{prod} - \sum \Delta S_{React}$

$-144\ J/K = 2x - \left[2(28\ J/K) + 3(152\ J/K)\right]$

$-144\ J/K = 2x - (56\ J/K + 456\ J/K)$

$-144\ J/K = 2x - 512\ J/K$

$512\ J/K - 144\ J/K = 2x$

$368\ J/K = 2x$

$184\ J/K = x$