Exercise 10-2

woensdag 20 mei 2020 20:46

ideal gas: $PV = nRT$

third law: all entropy change $\to 0$ as $T \to 0$

Maxwell relation: $\left(\frac{\partial P}{\partial T}\right)_V = \left(\frac{\partial S}{\partial V}\right)_T$

ideal gas: $\left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V = \frac{nR}{V} \neq 0$ for $T = 0$

Vander Waals gas: $\left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V = \frac{nR}{V - nb} \neq 0$ for $T = 0$

} both violate the third law and thus cannot hold near $T = 0$