

$$A_{\text{barne}} = -NkT \ln j$$

$$\mu_{\text{barne}} = -kT \ln j$$

$$S_{\text{barne}} = NkT \left( \ln j + T \frac{\partial}{\partial T} \ln j \right)$$

$$U_{\text{barne}} = NkT^2 \frac{\partial}{\partial T} \ln j$$

$$(C_V)_{\text{barne}} = Nk \frac{\partial}{\partial T} \left\{ T^2 \frac{\partial}{\partial T} \ln j \right\}$$