



## 4-2-4 Helmholtz energy 4

Consider the total differential  $da = \left(\frac{\partial a}{\partial T}\right)_v dT + \left(\frac{\partial a}{\partial v}\right)_T dv$ . What variable is represented by  $\left(\frac{\partial a}{\partial T}\right)_v$ ?

From  $da = -Pdv - sdT$  and  
 $da = \left(\frac{\partial a}{\partial T}\right)_v dT + \left(\frac{\partial a}{\partial v}\right)_T dv$  it can be seen that:

$$\left(\frac{\partial a}{\partial T}\right)_v = -s$$