$$\mu C_p dT = \mu C_v dT + p dV \quad \text{— (12)}$$

$\because \quad pV = \mu RT$

$$p \cdot \frac{dV}{dV} + \frac{dp}{dV} \cdot V = \mu R \frac{dT}{dV}$$

$\left\{ \frac{d}{dx}(f \cdot g) = f \cdot \frac{dg}{dx} + \frac{df}{dx} \cdot g \right.$

$$p + 0 = \mu R \frac{dT}{dV} \Rightarrow \quad p dV = \mu R dT \quad \text{— (13)}$$

by eq (12) & (13)

$$\mu C_p dT = \mu C_v dT + \mu R dT$$

$$C_p = C_v + R$$

$$\boxed{C_p - C_v = R} \quad \text{— (14)}$$