

# 伝熱

## 熱伝導

177 平面壁:  $Q = -\lambda A \frac{\Delta T}{l} = -\frac{\Delta T}{\frac{l_1}{\lambda_1 A_1} + \frac{l_2}{\lambda_2 A_2} + \dots}$  [W]

178 円筒壁:  $Q_{12} = \frac{\lambda (2\pi L) (T_1 - T_2)}{\ln(r_2/r_1)} = \frac{2\pi L (T_1 - T_{n+1})}{\frac{\ln(r_2/r_1)}{\lambda_1} + \frac{\ln(r_3/r_2)}{\lambda_2} + \dots}$   
 $= \frac{\lambda A_{lm} (T_1 - T_2)}{r_2 - r_1}, A_{lm} = \frac{2\pi L (r_2 - r_1)}{\ln(r_2/r_1)} = \frac{A_2 - A_1}{\ln(A_2/A_1)}$

## 熱伝達

$\alpha$ : 総括伝熱係数・熱貫流率 [W/(m<sup>2</sup>·K)]

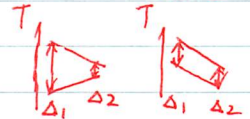
181  $Q_{12} = (T_1 - T_4) / \left( \frac{1}{h_1 A_1} + \frac{\delta}{\lambda A_{av}} + \frac{1}{h_2 A_2} \right)$

$= \frac{1}{\alpha_1 A_1} = \frac{1}{\alpha_2 A_2}$  ( $Q = \alpha_1 A_1 \Delta T = \alpha_2 A_2 \Delta T$ )

熱交換器

$Q = \alpha A \Delta t_{av}$

$\Delta t_{av} = \frac{\Delta_1 - \Delta_2}{\ln(\Delta_1/\Delta_2)}$



放射伝熱.

186  $Q_{12} = 5.669 \times 10^{-8} A_1 F_{12} (T_1^4 - T_2^4)$  (黒体)