

$P_{\text{ice(condenser)}} = 0.5 \text{ to } 3 \mu\text{bar}$

condenser

$T_{\text{ice(condenser)}} = -70 \text{ to } -80 \text{ }^{\circ}\text{C}$

$\frac{dq}{dt} = L \times \tau = \frac{dp}{dp} = \frac{dm}{dt}$

vapour flow resistance

$R_{\text{duct}}$

$R_{\text{stopper}}$

Radiation

$R_{\text{skin}}$

$R_{\text{dry}}(t)$

$K_{\text{ice}}(t)$

$K_v$

glass

Shelf  
to  
glass

Heat transfer  
coefficient

Mainly gas convection/conduction  
Limited "contact" conduction  
Model developed  
by Pikal and Shah (1984)

$A_v$

Heating

Shelf

$dq/dt = A_v \cdot K_v (-T_{\text{ice(base)}} + T_{\text{shelf(surface)}})$

Driving force for sublimation

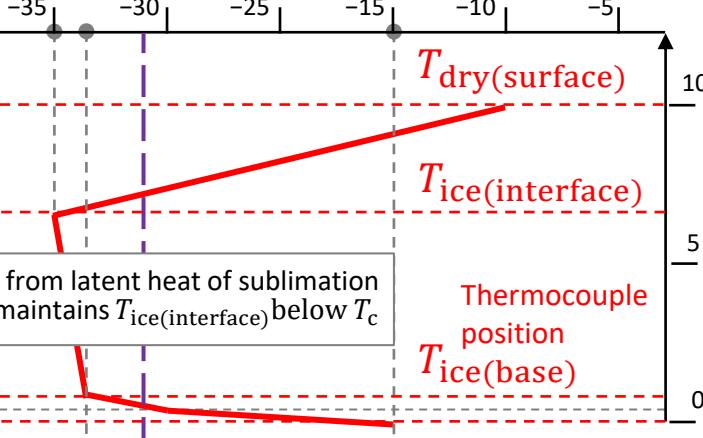
$dm/dt = \frac{A_i (\nu P_{\text{ice}} - \nu P_{\text{chamber}})}{(R_{\text{dry}} + R_{\text{skin}} + R_{\text{stopper}})}$

$= P_{\text{total}}$  Assumes that the chamber  
is saturated with vapour

Measured by capacitance manometer

$\nu P_{\text{ice}}$  Estimated from  $T_{\text{ice(interface)}}$  or vice versa,  
e.g., @  $-35 \text{ }^{\circ}\text{C}$   $\nu P_{\text{ice}} = ??? \mu\text{bar / Pa / mTorr}$

Temperature ( $T$ )  $^{\circ}\text{C}$



'Measurable' driving  
force for heating

$T_c$  (critical  
temperature)

$T_{\text{dry(surface)}}$

$T_{\text{ice(interface)}}$

Thermocouple  
position

$T_{\text{ice(base)}}$

$T_{\text{shelf(surface)}}$



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