High Mass Transfer Rates

Note Title 11/7/2014

Heat Transfer Correlations only work for mass transfer in dilute of equimolar systems

Why?

How is heat transferred?

How is mass transfer different?

The analogy works when mass transfer at the interface occurs by diffusion only. This is not true at high rates.

Qualitative illustration and discussion

Can derive a correction factor for situation where you have one species transferring.

Velocity correction is called a "bulk flow" correction

$$k_y' = \frac{k_y}{(1-y_A)_{\text{Log mean (lm)}}}$$

$$(1-y_A)_{lm} = \frac{(1-y_{A,I}) - (1-y_{A,\text{bulk}})}{\ln\left(\frac{1-y_{A,I}}{1-y_{A,\text{bulk}}}\right)}$$