for Am

$$-q C_{Am} + q K_{m-1} C_{A_1} C_{Am-1} = 0$$

Total Mass balance

$$n = \sum q C_{Ai} \times M_i \rightarrow (M_i \text{ is the molar mass})$$

$$= q\left(C_{Ai} M_1 + C_{A_2} M_2 + C_{A_3} M_3 \text{ ——}\right)$$

↓ mass exiting from system

for overall mass

$$q C_{A_i}^{0} M_1 = q\left(C_{A_1} M_1 + C_{A_2} M_2 + C_{A_3} M_3 \text{ ——}\right)$$

$M_1/M_1 = 1 \quad \frac{M_2}{M_1} = 2, \quad \frac{M_3}{M_1} = 3$ ——

$$C_{Ai}^{0} = C_{A_1} + 2C_{A_2} + 3C_{A_3} \text{ ——}$$

$$C_{Ai}^{0} = \sum_{j=1}^{m-1} j\, C_{Aj}$$

$$C_{Am} = \frac{K_{m-1} C_{A_1} C_{Am-1}}{}$$

$$C_{Am} = \frac{q K_{m-1} C_{Am-1} C_{A_1}}{q K_m C_{A_1} + q}$$

Assuming $\eta = \left(\frac{KV}{q}\right)$