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ac.

**RD**

**Startup of CSTR**

general EB:

PFR : CSTR

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| --- | --- |
|  |  |
|  max CA CB by PFR at high P (no diluents) or batch |  min CA CB by CSTR or large recycle in PFR, dilute with inert |
|  max CA min CB, add B constantly in semibatch or in PFR along the axial length, recycle with excess A |  max CB min CA, add A constantly in semibatch or in PFR along the axial length, recycle with excess B |
| A🡪D A🡪U high T rxn higher Ea. High R gives high SD but low throughput. Low R gives low SD but high throughput. MSS are possible with **exothermic wall-cooled CSTR and adiabatic PFR with large recycle ratio** |

If MASI on AS and S, **QE** , the number of ith mechanistic step required

**Rxn lim**- rate ↑ T↑ (exponentially), no change in rxn as flow rate

External transport,

External MT lim- rate ↑ with Q ↑ (BLT ↓and Re↑), T ↑ (linearly)

|  |  |  |
| --- | --- | --- |
| For only external C gradient and no internal T or C gradient, use SS MB on BL (at TS): | For internal C gradient but no external T or C gradient, use internal SS MB  | Both internal and external MT, no T gradient (at Ts)external transport = internal reaction |
|  |
|  |  |  |

Internal MT lim- loss of exponential dependence on T (lower than what it should be)

Mears’ Criterion for excluding external MT:

Half life method: