Methyl propionate synthesis in the Lucite Alpha process

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Process Description-

Ethylene and carbon monoxide gas feeds are compressed to the pressure of 40 bar and the temperature should not exceed 200°C. The methanol is feeded in another material stream and pressurized to 40 bar by a liquid pump. Then both the streams are mixed and feeded to a Continuous Stirred Tank Reactor which is operated at 100°C and 40 bar. The reaction which is mentioned below is carried out in the reactor and the reaction is exothermic.
The output solution of the reactor majorly consists of methyl propionate and methanol. Then the solution is decomposed to atmospheric pressure and 64°C. Then the mixture is feeded to flash separator in which gas and liquid is separated. Then the part of the solution that was evaporated is fed to a distillation column. The column consists of 40 equilibrium stages and the reflux ratio of 1.5. The feed enters at stage 10. The product we get from the downstream of the column is the methyl propionate about 55% at about 70°C and the upstream is recycled.

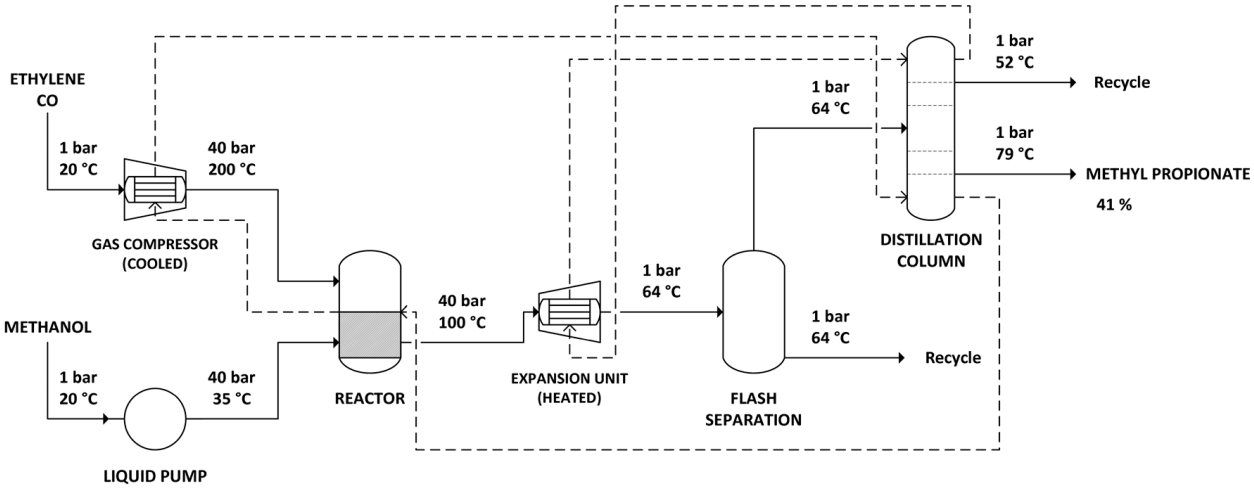
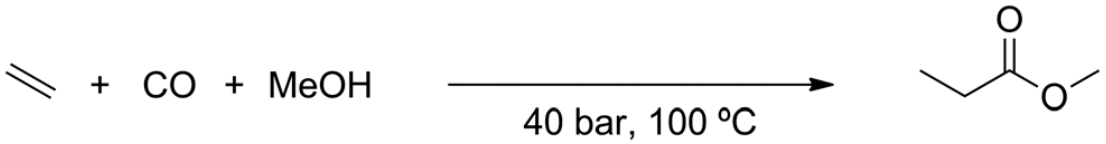


Fig.1 Process flow sheet of methyl propionate synthesis in the Lucite Alpha process.



Reaction- Methyl propionate synthesis in the Lucite Alpha process.

References-

- https://pubs.rsc.org/en/Content/ArticleLanding/2017/RE/C7RE00094D#!divAbstract