Swan-SCF™

Making chemicals the environmentally friendly way

Reactions in supercritical fluids (SCF) have been proven in numerous fields to offer an alternative method of producing chemicals without the need for hazardous solvents. The supercritical reaction processes have proven that traditional production of chemicals in batch processes can now be made continuously with higher conversion and selectivity.

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The Process

The fluid, used as solvent, is stored in the work tank from where it is sub-cooled before being fed to the pump unit. The pump increases the pressure of the fluid, which is then heated to the desired supercritical conditions. The operating conditions vary between different reactions and are therefore adjustable in the process.

The reactants are fed into the solvent, then into a mixer and onto the reactor. In the reactor the reactants pass over a heterogeneous catalyst where the reaction takes place. On leaving the reactor the product mixture passes through a pressure control valve, which reduces the pressure of the product mixture to subcritical conditions, creating a two-phase system.

The mixture enters the separator where heat can be added to evaporate the solvent. The liquid product will stay in the separator and is periodically collected. The gas phase from the separator enters the condenser where the solvent is condensed and returned to the work tank.

So far the process has been proven to achieve excellent conversion and selectivity for hydrogenations, Friedel-Crafts reactions, and hydroformylations, whilst quantitative conversion has been achieved for etherification reactions.

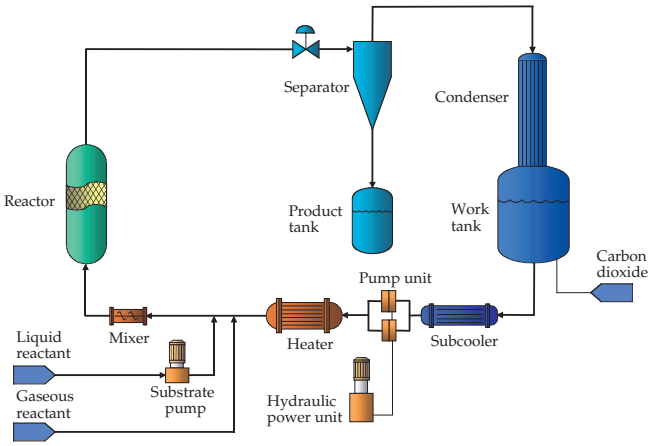
The use of continuous processing, fixed-bed reactors and supercritical solvent enables the products to be easily recovered, with minimal downstream processing whilst incorporating built-in recovery of the solvent.

Facts about SCF Reactions

- Green process
- Well proven for hydrogenations, Friedel-Crafts reactions, etherifications and hydroformylations
- Integrated solvent recovery
- Solvent is tunable to achieve different isomers
- Co-solvents can be used to increase scope

Benefits of SCF Reactions

- High conversion and selectivity
- Minimal purification of product required
- Reduced by-products
- Continuous processing gives high through-put and stable quality
- The main solvent, carbon dioxide, is naturally occurring, inexpensive, colourless, odourless, tasteless, non-flammable, non-ozone depleting and non-toxic



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