CHEMCAD 5.0

Acetonitrile-Acrylonitrile Separation by Extractive Distillation

Marie	Stream No.	-	0		4	ы	
flow kmol/hr 13599.8 17244.0 674.8 206.0 29963.0 flow kg/hr 245000.0 327000.0 28142.7 4074.1 539783.1 C 20.0 84.4 75.8 104.2 108.3 bar	Mame	Матеп	TEED MIX	ACR	ACM	Water	
flow kmol/hr l13599.8 l17244.0 674.8 206.0 29963.0 flow kg/hr 245000.0 327000.0 28142.7 4074.1 539783.1 C 20.0 84.4 75.8 104.2 108.3 bar l.8 l.4 l.2 l.3 l.4 l.4 l.2 l.3 l.4 mole fraction 0.0000 1.000E-005 l.000 l.000 0.0000 MJ/hr -3.890SE+006 -4.6443E+006 32902442688.3719E+006 l vol m3/h 245.5 349.6 l.5878.6 5004.1 567.2 iq m3/h 304820.6 386500.2 l.5124.2 4617.2 671579.4 nent mass fractions nitrile 0.0000 0.0740 0.8598 0.0005 0.0000 nitrile 0.0000 0.09240 0.1399 0.8413 l.0000							
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1.8 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.2 1.3 1.4 1.0000 1.000E-005 1.000 0.0000 1.0000 1.000E-005 1.000 0.0000 1.0000 1.000E-005 1.000 0.0000 1.0000 0.00240 0.1399 0.8413 1.0000	Temp C	20.0	84.4	75.8	104.2	108.3	——————————————————————————————————————
-3.8905E+006	s bar	1.8	1.4	1.2	1.3	1.4) <mark> </mark>
-3.8905E+006 -4.6443E+006 32902442688.3719E+006 m3/h 245.5 349.6 15878.6 5004.1 567.2 3/h 245.0 332.8 33.7 4.3 539.9 C m3/h 304820.6 386500.2 15124.2 4617.2 671579.4 mass fractions ile 0.0000 0.0740 0.8598 0.0005 0.0000 1.0000 0.9240 0.1399 0.8413 1.0000	or mole fraction	0.0000	1.000E-005	1.000	1.000	0.0000	1
245.5 349.6 15878.6 5004.1 567.2 245.0 332.8 33.7 4.3 539.9 304820.6 386500.2 15124.2 4617.2 671579.4 0.0000 0.0740 0.8598 0.0005 0.0000 0.0000 0.0020 0.0003 0.1582 0.0000 1.0000 0.9240 0.1399 0.8413 1.0000		-3.8905E+006	-4.6443E+006	32902.		8.3719E+006	
245.0 332.8 33.7 4.3 539.9 304820.6 386500.2 15124.2 4617.2 671579.4 0.0000 0.0740 0.8598 0.0005 0.0000 0.0000 0.0020 0.0003 0.1582 0.0000 1.0000 0.9240 0.1399 0.8413 1.0000	ual vol m3/h	245.5	349.6	15878.6	5004.1	567.2	- -
304820.6 386500.2 15124.2 4617.2 671579.4 0.0000 0.0740 0.8598 0.0005 0.0000 0.0000 0.0020 0.0003 0.1582 0.0000 1.0000 0.9240 0.1399 0.8413 1.0000	.liq m3/h	245.0	332.8	33.7	4.3	539.9	3 2
0.0000 0.0740 0.8598 0.0005 0.0000 0.0000 0.0020 0.0003 0.1582 0.0000 1.0000 0.9240 0.1399 0.8413 1.0000	. vap 0 C m3/h	304820.6	386500.2	15124.2	4617.2	671579.4	
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0.0020 0.0003 0.1582 0.0000 0.9240 0.1399 0.8413 1.0000	Acrylonitrile	0.0000	0.0740	0.8598	0.0005	0.0000	Nor-Dar a
1.0000 0.9240 0.1399 0.8413	tonitile	0.0000	0.0020	0.0003	0.1582	0.0000	
	ij	1.0000	0.9240	0.1399	0.8413	1.0000	

Acrylonitrile/Acetonitrile Extractive Distillation with Sensitivity Study

DESCRIPTION:

ACN recovered

This example presents a very difficult problem where the range of desired operation is extremely narrow. A purge or pasteurization column is used to separate two very close boiling organics, acetonitrile (ACN) from acrylonitrile (ACR). These cannot be separated by conventional distillation, so large excess of water is added, causing a shift in relative volatilities, thus making the separation feasible.

This is a typical example for extractive distillation.

The process is extremely difficult to calculate due to complex thermodynamics. The Sensitivity Study option saves time needed by the engineer to find the carefully balanced process conditions.

Sensitivity Analysis

