Libr-H_2O Vapor Absorption Refrigeration Cycle

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Abstract:

Refrigeration is the most important process in different Industries as it helps remove unwanted heat from substances, so the choice of good and economical refrigerant should be considered. LiBr-H2O is one of the choices as it shows easy separation and can be recycled. In this flowsheet, feed (S-1) is pressured and then preheated using the excess heat of S-4 and then during generation/desorption water is separated from the mixture as S-7. S-7 is then condensed, expanded, and then fed to an evaporator after evaporation and is mixed with depressurized recycle of the mixture(S-6). The mixed stream (S-10&6) is fed to the absorber and then recycled back to the S-1.

Property Package: CoolProp (Incompressible Mixture)

Results:

Object	S-9	S-8	S-7	S-6	S-5	S-4	S-3	S-2	S-1A	S-10&6	S-10	S-1	Unit
Temperature	0.61	39.92	63.85	45.41	53.30	63.85	63.80	32.70	32.70	41.67	0.78	32.70	°C
Pressure	0.67	7.46	7.46	0.67	7.46	7.46	7.46	7.46	0.67	0.67	0.67	0.67	kPa
Mass Flow	0.08	0.08	0.08	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.08	1.00	kg/s
Molar Fraction (Vapor)	0.07	0.00	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.16	1.00	0.00	-
Mass Fraction (Mixture)/LiBr	0.00	0.00	0.00	0.63	0.63	0.63	0.57	0.57	0.57	0.57	0.00	0.57	-

Reference:

- Somers, C., Mortazavi, A., Hwang, Y., Radermacher, R., Rodgers, P., & Al-Hashimi, S. (2011). Modeling water/lithium bromide absorption chillers in ASPEN Plus. Applied Energy, 88(11), 4197-4205.