

Supplementary Materials: Design and Optimization of a Process for the Production of Methyl Methacrylate via Direct Methylation

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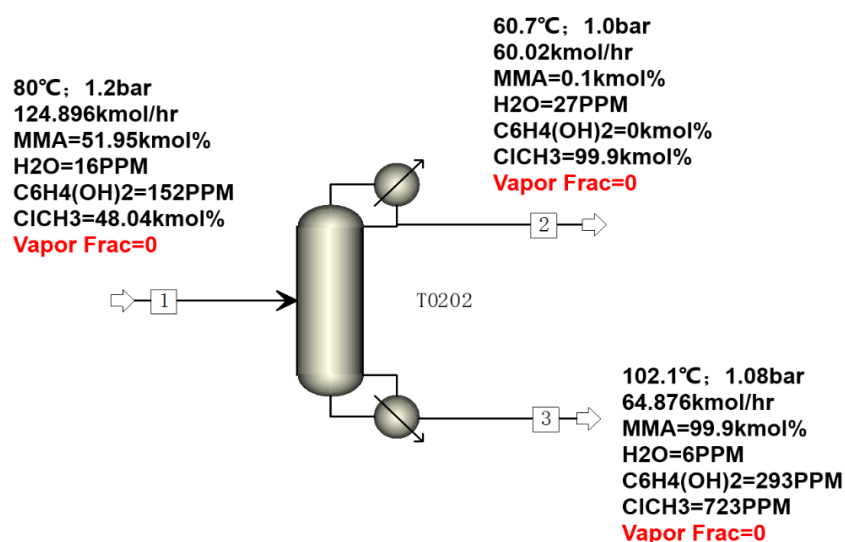
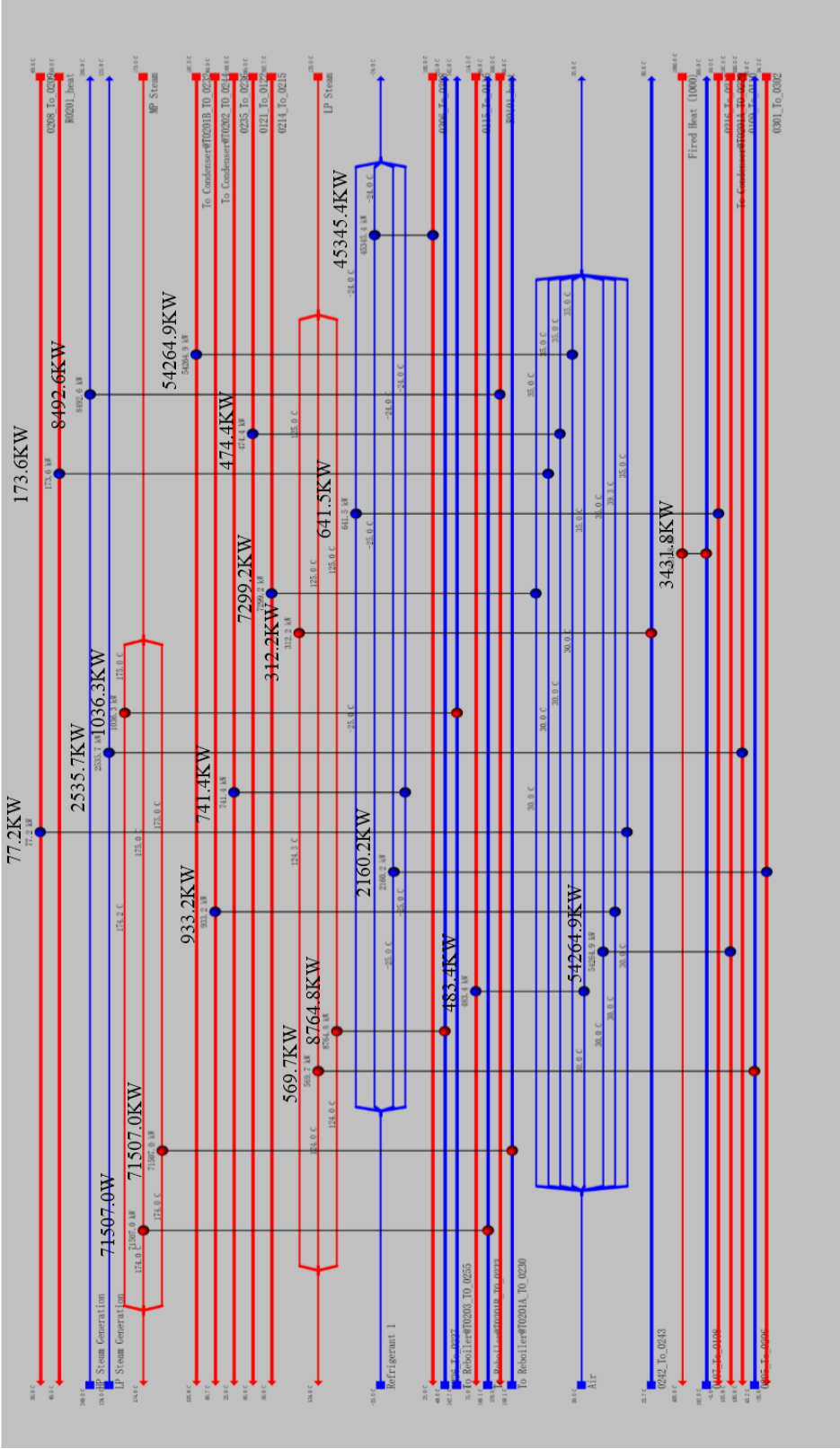
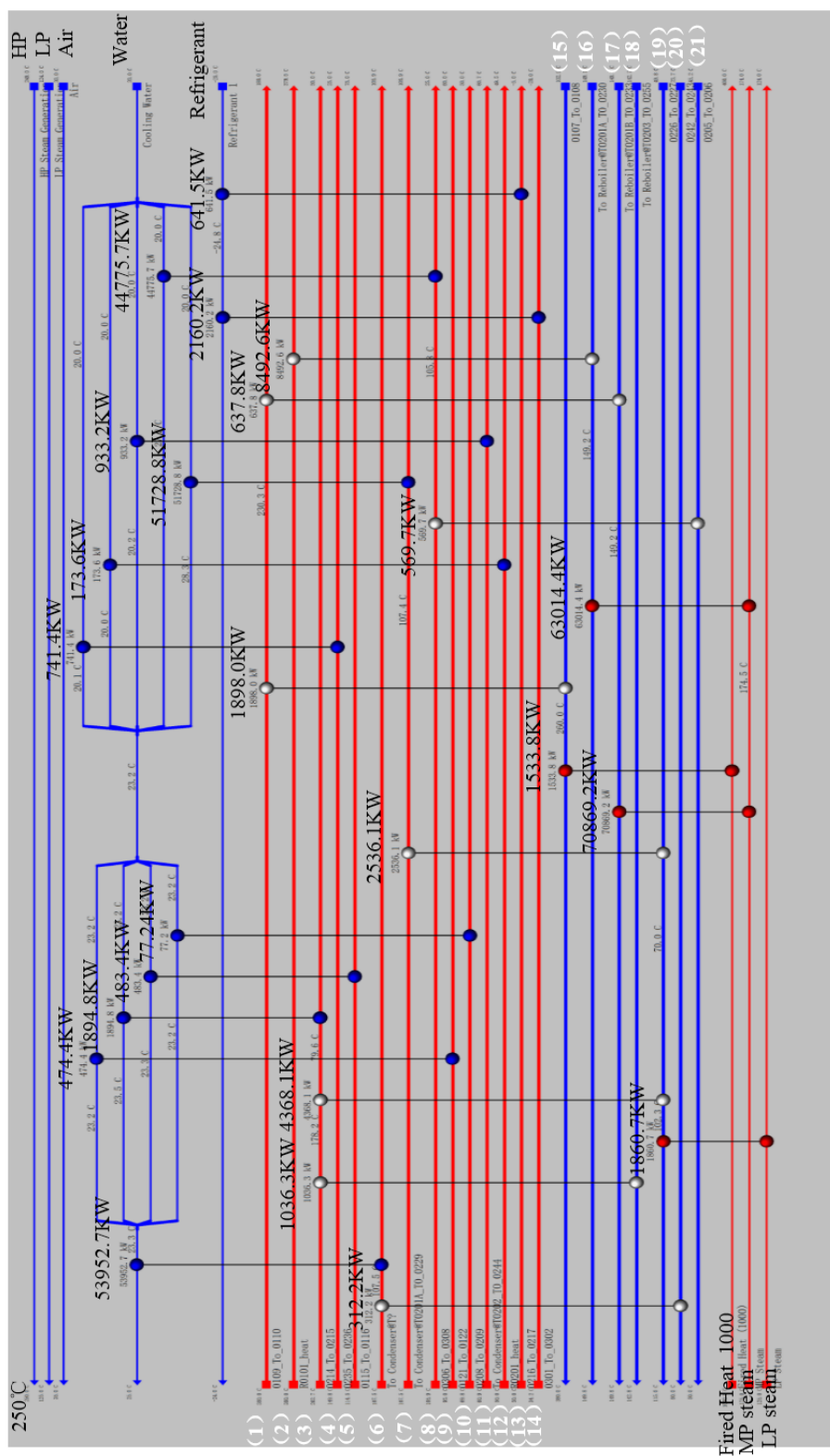


Figure S1. The purification process of MMA using a normal distillation design.



Before optimization



After optimization

Figure S2. The fitting result diagram of processes for MMA before and after optimizing the heat-exchange network. The red and blue lines represent the heat increase and heat decrease of united facilities (such as condenser, reboiler, etc.).

Table S1. The cool and hot stream information after the heat-exchange process, based on Figure S2.

Real Streams	Streams	Inlet Temperature (°C)	Outlet Temperature (°C)	Heat Duty (kW)	Noted Streams
0109_To_0110	Hot1	380	180	2535.8	(1)
R0101_heat	Hot2	380	379.5	8492.57	(2)
0214_To_0215	Hot3	263.11	50	7304.2	(3)
0235_To_0236	Hot4	149.75	25	741.4	(4)
0115_To_0116	Hot5	115	75	483.4	(5)
ToCondenser@T0201B_TO_0232	Hot6	107.47	105.86	54264.89	(6)
ToCondenser@T0201A_TO_0229	Hot7	107.47	105.86	54264.89	(7)
0306_To_0308	Hot8	105.8	25	45345.4	(8)
0121_To_0122	Hot9	95	60.	474.45	(9)
0208_To_0209	Hot10	69.82	50.	77.2	(10)
ToCondenser@T0202_TO_0244	Hot11	60.87	60.7	498.59	(11)
R0201_heat	Hot12	50	49.5	173.64	(12)
0216_To_0217	Hot13	50	-5.	641.5	(13)
0301_To_0302	Hot14	34.2	-20	2160.2	(14)
0107_To_0108	Cool1	102.87	380	3431.8	(15)
ToReboiler@T0201A_TO_0230	Cool2	149.14	149.75	71506.98	(16)
ToReboiler@T0201B_TO_0233	Cool3	149.14	149.75	71506.98	(17)
ToReboiler@T0203_TO_0255	Cool4	142.66	142.77	1221.4	(18)
0226_To_0227	Cool5	49.75	115	8764.8	(19)
0242_To_0243	Cool6	23.7	80.	312.2	(20)
0205_To_0206	Cool7	45.17	50	569.7	(21)

Note: The hot streams consist of Hot1 to Hot14, and the cool streams include 7 streams of Cool1 to Cool7.