fluid pump 122 is started (step S21), and the second fluid is transferred toward the second inlet of the microreactor 10 (step S22). Then, after the transfer of the second fluid toward the second inlet of the microreactor 10 is started, the arrival of the second fluid is detected by the second fluid detection sensor 123 (step S23), the second fluid pump 122 is stopped based on the detection, and the transfer of the second fluid is stopped (step S24). When the transfer of the second fluid is stopped, the pipeline to the second inlet of the microreactor 10 is filled with the second fluid of which transfer is stopped.

[0063]

The operation of transferring the second fluid and temporarily stopping the transfer of the second fluid may be performed before the transfer of the first fluid is started, or may be performed after the transfer of the first fluid is started and before the first fluid reaches the first inlet of the microreactor 10.

[0064]

Meanwhile, the first fluid pump 112 continues to operate, and transfers the first fluid toward the first inlet of the microreactor 10. When the leading end position of the first fluid reaches the first inlet of the microreactor 10, the arrival of the first fluid is detected by the first fluid detection sensor 113 (step S41). The detection signal

from the first fluid detection sensor 113 is transmitted to the control device.

[0065]

Subsequently, after the detection by the second fluid detection sensor 123 and after the detection by the first fluid detection sensor 113, the second fluid pump 122 resumes the transfer based on the signal input from the control device (step S42). That is, after the second fluid pump 122 is temporarily stopped by the detection and the transfer of the second fluid is stopped, and after the detection by the first fluid detection sensor 113, the transfer of the fluid is immediately resumed.

[0066]

When the transfer is resumed, the first fluid being transferred and the second fluid of which transfer has been temporarily stopped at the second inlet of the microreactor 10 are introduced into the microreactor 10 (step S43). Then, the first fluid and the second fluid merge at the junction 130 and start mixing or reacting.

[0067]

Next, the mixed fluid after the merging at the junction 130 flows through the discharge channel 140 and is discharged from the outlet 104 (step S44). Subsequently, the mixed fluid flows through the tube t while continuing mixing or reacting, and is finally recovered in the recovery container

fluid A or the fluid B is started and before the primary mixed fluid (fluid A + B) reaches the first inlet of the second-stage microreactor 10B.

[0106]

Meanwhile, the fluid A pump 12 and the fluid B pump 22 continue to operate, and transfer the primary mixed fluid (fluid A + B) toward the first inlet of the second-stage microreactor 10B. When the leading end position of the primary mixed fluid (fluid A + B) reaches the first inlet of the second-stage microreactor 10B, the arrival of the primary mixed fluid (fluid A + B) is detected by the primary mixed fluid detection sensor 13b (step S161). A detection signal from the primary mixed fluid detection sensor 13b is transmitted to the control device.

[0107]

Subsequently, after the detection by the fluid C detection sensor 33 and the detection by the primary mixed fluid detection sensor 13b, the fluid C pump 32 resumes the transfer based on the signal input from the control device (step S162). That is, after the fluid C pump 32 is temporarily stopped by the detection and the transfer of the fluid C is stopped, and after the detection by the primary mixed fluid detection sensor 13b, the transfer of the fluid is immediately resumed.

[0108]

D pump 42 is started (step S141), and the fluid D is transferred toward the second inlet of the third-stage microreactor 10C (step S142). Then, after the transfer of the fluid D toward the second inlet of the third-stage microreactor 10C is started, the arrival of the fluid D is detected by the fluid D detection sensor 43 (step S143), the fluid D pump 42 is stopped by the detection, and the transfer of the fluid D is stopped (step S144). When the transfer of the fluid D is stopped, the pipeline to the second inlet of the third-stage microreactor 10C is filled with the fluid D of which transfer is stopped.

[0112]

The operation of transferring the fluid D and temporarily stopping the transfer of the fluid D may be performed before the transfer of the fluid A, the fluid B, or the fluid C is started, or may be performed after the transfer of the fluid A, the fluid B, or the fluid C is started and before the secondary mixed fluid (fluid A + B + C) reaches the first inlet of the third-stage microreactor 10C.

[0113] Meanwhile, the fluid A pump 12, the fluid B pump 22, and the fluid C pump 32 continue to operate, and transfer the secondary mixed fluid (fluid A + B + C) toward the first inlet of the third-stage microreactor 10C. When the leading end position of the secondary mixed fluid (fluid A + B + C)

with a first leak detection sensor 16a, the second-stage microreactor 10B is provided with a second leak detection sensor 16b, and the third-stage microreactor 10C is provided with a third leak detection sensor 16c. Further, the fluid A pump 12 is provided with a fluid A leak detection sensor 15, the fluid B pump 22 is provided with a fluid B leak detection sensor 25, the fluid C pump 32 is provided with a fluid C leak detection sensor 35, and the fluid D pump 42 is provided with a fluid D leak detection sensor 45.

[0144]

As the leak detection sensors (16a, 16b, 16c, 15, 25, 35, 45), for example, an appropriate detector of a method such as an inter-electrode resistance detection method, an optical method, a flow rate detection method, or a weight detection method can be used.

[0145]

In the above microreactor system 5 and the operation method thereof, the fluid leak that may occur in the microreactors or the pumps can be detected by the leak detection sensors. This can reliably prevent the leak of the fluid from the microreactors or the pumps and the recovery of the mixed fluid mixed with a mixing ratio deviating from the desired mixing ratio.

[0146]

<Sixth embodiment>