have a different affinity for the inner wall of at the other side of the fine channel partitioned by the partition walls, two adjacent flows of fluid flowing as laminar flows in the fine channel having a length of about several cm can be fed in mutually opposite direction. Accordingly, it is possible to conduct experiments for verifying whether or not it is possible to change an equilibrium of chemical reaction or solvent extraction.

[**0092**] Further, in the fine channel device of the present invention, a film having fine pores a diameter of which is smaller than any distance between adjacent partition walls can easily be formed between adjacent partition walls in a flowing direction of fluid. The material for such film may be a polymeric material such as nylon, acryl or cellulose, or may be an inorganic material such as silicon oxide, titanium oxide, alumina or zirconia, or may be a combination of a polymeric material and an inorganic material.

[**0093**] With respect to the formation of a film in the fine channel, the before-mentioned non-patent document 2 describes a case of forming nylon at the fluid boundary in a fine channel. However, the length of the fine channel permitting the formation of the film is about 1 mm at the most. Accordingly, the length was insufficient in practical use. On the other hand, according to the fine channel device of the present invention, a large number of partition walls with intervals of 1 mm or less can be formed in a flowing direction of fluid in a fine channel having a length of from several cm to several tens cm. Then, a film made of, for example, a polymeric material such as nylon, acryl or cellulose can be formed certainly between all adjacent partition walls. This is a feature of the fine channel device of the present invention.

[**0094**] Accordingly, a film of polymeric material such as nylon, acryl or cellulose can be formed according to the known technique disclosed in the non-patent document 2. Thus, a polymeric film capable of selectively separating can be formed in a fine channel having a practically usable length. Further, the fine channel device having a fine channel of practically usable length of the present invention makes it possible to conduct experiments as disclosed in the non-patent document 3 wherein a biochemical reaction is carried out by immobilizing an enzyme on a polymeric film formed at the fluid boundary of the fine channel.

[**0095**] As described before, the material of such film may be an inorganic material such as silicon oxide, titanium oxide, alumina or zirconia. Such an inorganic film can be formed by a series of steps as shown in **FIG. 10**, for example. Namely, at a step (**1**), a fine channel device of a 2-inlet-2-outlet system having two inlet ports and two outlet ports, prepared according to the present invention, is heated to an appropriate temperature, a thermosetting resin **44** is supplied from an inlet port and an aqueous phase **1** is supplied from the other inlet port to form each laminar flow. A heating temperature is gradually increased by a heater **45** to cure the thermosetting resin. At a step (**2**), suspension **46** obtained by suspending an inorganic material such as silicon oxide, titanium oxide, alumina or zirconia in an aqueous solution of ammonia or sodium hydroxide by a so-called sol-gel method, which is heated to an appropriate temperature, is supplied from the inlet port into which the aqueous phase is previously supplied. At a step (**3**), an inorganic material is coated on the inner surface at one side of the fine channel. At a step (**4**), acid or alkali is supplied from the inlet port from which the suspension of inorganic material is supplied to cure the thermosetting resin, to the other side of the fine channel, and the cured resin is removed. At a step (**5**), a porous film **48**, made of an inorganic material having a thickness of 1 μm-5 μm is formed in each space between adjacent partition walls. Such a thin porous film of inorganic material can be used to carry thereon a catalyst whereby a catalytic reaction can be realized between adjacent flows of fluid. This is a feature of the fine channel device of the present invention.

[**0096**] Further, in the fine channel device of the present invention, a metallic film **49** may be disposed in the entire inner surface of the fine channel and/or the wall surface of the partition walls as shown in **FIG. 11**(*a*), or a metallic film **49** is disposed in a part thereof as shown in FIGS. **11**(*b*) and **11**(*c*). The structure shown in **FIG. 11**(*a*) provides such advantages that the affinity of the inner wall of the fine channel can be changed; an electric current can be supplied to the metallic film by using a known power source or an eddy current is generated in the metal by electromagnetic induction to heat the metal to use it as a heater, whereby the fluid flowing in the fine channel contacts directly the metal to obtain an efficient reaction by heating. Further, when the metal is a metal such as tungsten, platinum, palladium or ruthenium, it can be utilized as a catalyst for synthesis or decomposition for ammonia.

[**0097**] In the embodiments shown in FIGS. **11**(*b*) and **11**(*c*), an electric field can be produced between metallic films disposed in the fine channel by applying a voltage having a potential across the metallic films. For example, when the depth of the fine channel shown in **FIG. 11**(*c*) is 10 μm and a voltage of 10 V is applied across electrodes, a field intensity of 1×10^6 V/m can be generated. The field intensity corresponds to a field intensity obtained by applying a high voltage of 10 kV across electrodes spaced with 10 mm. Namely, a strong electric field can easily be generated by using a power source comprising several dry cells in the fine channel, and such strong electric field can control the alignment of polarized molecules, and can increase selectivity of a chemical reaction.

[**0098**] The metallic film in the fine channel can be formed by a known technique such as sputtering, electrolytic plating, electroless plating, vapor deposition, CVD or the like. The thickness of the metallic film is not in particular limited. However, a thickness of several nm to several tens μm is preferred in consideration of the size of the fine channel.

[**0099**] The fine channel device of the present invention may have a circulating channel to feed fluid discharged from an outlet port to an inlet port. The circulating channel includes a channel for recovering a reaction product and a channel for waste fluid as the case requires. In this specification, a circulating channel, a channel for recovering a reaction product and a channel for waste fluid is generally called as an outlet channel.

[**0100**] The circulating channel serves to feed a raw material-containing fluid for a chemical reaction in the separated fluid, and the circulating channel is communicated with any one or all inlet ports through an outlet port. The fine channel device having such channel can separate effectively a reaction product produced in a chemical reaction; recover a raw