However, the temperature gradient is higher at the position exceeding 0.4 m (1/3 region on the upstream side) (the curve of reference sign D1 in FIG. 8(b)). Due to the balance between the temperature rise resulting from the heat transfer corresponding to this and the heat absorption resulting from the progress of the reaction, the temperature at the reaction flow channel side appears as the curve of reference sign D2 in FIG. 8(a) and the temperature gradient is higher at the position exceeding 0.4 m (1/3 on the downstream side). In contrast, with setting 2, the heat transfer promoter 53 is formed such that the heat transfer performance at 1/2 of the heat medium flow channel on the upstream side is lower than setting 1 while the heat transfer performance at 2/3 on the downstream side is higher than setting 1. Accordingly, the heat transfer is suppressed at the upstream side of the heat medium flow channel and the heat of the heat medium is transferred intensively at the downstream side of the heat medium flow channel (= the upstream side of the reaction flow channel). Hence, on the temperature distribution on the heat medium flow channel side, the temperature gradient over the region from 0 to 0.4 m (2/3 on the downstream side) is higher than setting 1, while the temperature gradient over the region exceeding 0.4 m (1/3 on the upstream side) is lower than setting 1, as illustrated by the curve of reference sign D3. Correspondingly, on the temperature distribution at the reaction flow channel side too, the temperature gradient over the region from 0 to 0.4 m (2/3 on the upstream side) is higher than setting 1, and the temperature gradient over the region exceeding 0.4 m (1/3 on the downstream side) is lower than setting 1, as illustrated by the curve of reference sign D4. Consequently, the temperature difference between the positions at 0.4 m and 0.6 m at the heat medium flow channel side decreases from approximately 106°C (setting 1) to approximately 78°C (setting 2), and the temperature difference at the reaction flow channel side decreases from approximately 95°C (setting 1) to approximately 76°C (setting 2).

reaction, decarbonylation reaction, reductive carbonylation reaction, carboxylation reaction, reductive carboxylation reaction, reductive coupling reaction, condensation reaction, decomposition (cracking) reaction, hydrogen decomposition reaction, cyclization reaction, cyclooligomerization reaction, dehalogenation reaction, dimerization reaction, epoxidation reaction, esterification reaction, exchange reaction, halogenation reaction, hydrogenation reaction, hydrogen halogenation reaction, homologation reaction, hydration reaction, dehydration reaction, dehydrogenation reaction, hydrogen carboxylation reaction, hydrogen formylation reaction, hydrogenolysis reaction, hydrogen metalation reaction, hydrosilylation reaction, hydrolysis reaction, hydrotreating reaction, isomerization reaction, methylation reaction, demethylation reaction, metathesis (substitution) reaction, nitration reaction, oxidation reaction, partial oxidation reaction, polymerization reaction, reduction reaction, reverse water gas shift reaction, sulfonation reaction, telomerization reaction, transesterification reaction, and trimerization reaction.

[0047]

A fluid containing a substance (reactant) such as a raw material to participate in a chemical reaction as listed above can be supplied as a reaction fluid to the reactor to synthesize a target product. The reaction fluid may contain a carrier that is not involved in the reaction. The carrier can be appropriately selected from the substances that do not affect the progress of the reaction, in consideration of the chemical reaction to be carried out. Carriers usable for a gaseous reaction fluid include gaseous carriers such as an inert gas or a low-reactive gaseous substance (at the temperature inside the reactor).

[0048]

Also, fluidic substances that do not corrode the constituent material of the reactor are usable as the heat medium. For example, liquid substances such as water and oil

[Claim 7] The reactor according to any one of claims 1 to 6, wherein each of the partial heat transfer promoters of the plurality of types includes at least one of a small piece, a hole, a cutout, a louver, and a slit which can be hooked.

[Claim 8] The reactor according to any one of claims 1 to 7, wherein the partial heat transfer promoters of the plurality of types are different from each other in at least one of thermal conductivity of a constituent material and contact area with the heat medium.

[Claim 9] The reactor according to claim 5 or 6, wherein the shapes of the corrugated plates of the partial heat transfer promoters of the plurality of types are different from each other by type in at least one of pitch and height.

[Claim 10] The reactor according to any one of claims 1 to 9, further comprising:

a catalyst that promotes a reaction of the reaction fluid, in the reaction flow channel.