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BRITISH PETROLEUM CO PLC

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Conversion of natural gas into higher hydrocarbon(s) - by integrated steam reforming and Fischer-Tropsch processes involving no sepn. and recycle of carbon di:oxide (Eng)

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USE/ADVANTAGE

Integration of the reforming and Fischer-Tropsch processes is more cost-effective, not requiring sepn. of CO₂ from the reformer output and subsequent recycling.

PREFERRED EMBODIMENTS

(a) is carried out at 700-1100°C and pressure of 1000-8000 kPa.

(b) is carried out at 150-350 °C adn pressure of 100-10,000 kPa.

(a) involves partial reaction of steam and (I), passing of the product to an autothermal reformer together with fresh (I), steam and O₂, and circulation of product stream from autothermal reformer back to the steam reforming; where it provides a source of heat for the reaction.

(III) is subjected to water and/or H₂ removal before (b).

50-99% of (V) is recycled back to (a), pref. to give 10-40 vol.% CO₂ w.r.t.(I). The portion of (V) being recycled is pre²-reformed to remove higher hydrocarbons before recycling.

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Conversion of natural gas (I) into higher hydrocarbons (II) comprises:

(a) reacting (I) with steam in a reforming zone contg. a reforming catalyst to give a first product stream (III) contg. CO, CO₂ and H₂;

(b) passing (III), without sepg. CO₂, to a Fischer-Tropsch reactor to give a second product stream (IV) contg. (II) and CO₂;

(c) passing (IV) to a recovery zone where (II) are recovered, the remaining components of (IV) forming a third product stream (V); and

(d) passing at least part of (V) into the reforming zone of (a).

EXAMPLE

The gas conversion process without CO₂ recycle 10-12% net saving in plant costs compared to a conventional process with CO₂ recycle where CO₂ recycle represents about 30% of total synthesis costs.(11pp2274SLDwgNo0/5)

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