CLAIMS

[Claim 1]

A hydrocarbon generation system comprising:

a first generation apparatus configured to generate a hydrocarbon with two or more carbon atoms from a first raw material containing: at least one of carbon monoxide and carbon dioxide; and hydrogen; and

a second generation apparatus configured to generate methane from a second raw material containing: hydrogen; and at least one of carbon monoxide and carbon dioxide contained in the first raw material and discharged from the first generation apparatus,

wherein the first generation apparatus is provided with an iron catalyst for generating the hydrocarbon with two or more carbon atoms from the first raw material, and the second generation apparatus is provided with a nickel catalyst for generating the methane from the second raw material.

[Claim 2]

The hydrocarbon generation system according to claim 1, wherein the first generation apparatus generates the hydrocarbon with two or more carbon atoms from 20% by mass or more and less than 85% by mass of the carbon dioxide contained in the first raw material.

[Claim 3]

The hydrocarbon generation system according to claim 1 or 2, wherein the second generation apparatus generates the methane from 85% by mass or more of the carbon dioxide contained in the second raw material.

[Claim 4]

The hydrocarbon generation system according to any one of claims 1 to 3, further comprising:

a carbon dioxide capture apparatus configured to capture carbon dioxide from a gas containing carbon dioxide,

wherein the carbon dioxide contained in the first raw material includes carbon dioxide separated at the carbon dioxide capture apparatus.

[Claim 5]

The hydrocarbon generation system according to claim 4, wherein the carbon dioxide capture apparatus comprises:

an absorption apparatus configured to form an alkaline solution containing carbon dioxide by gas-liquid contact between a gas containing carbon dioxide and an alkaline solution; and

a separation apparatus configured to separate carbon dioxide from the alkaline solution containing carbon dioxide,

wherein the carbon dioxide contained in the first raw material includes the carbon dioxide separated at the separation apparatus.

[Claim 6]

The hydrocarbon generation system according to any one of claims 1 to 5, wherein at least a part of one of heat of reaction when the hydrocarbon with two or more carbon atoms is generated in the first generation apparatus, and heat of reaction when the methane is generated in the second generation apparatus is recovered.

[Claim 7]

The hydrocarbon generation system according to claim 5, wherein the separation apparatus separates carbon dioxide from the alkaline solution containing carbon dioxide by using at least a part of one of heat of reaction when the hydrocarbon with two or more carbon atoms is generated in the first generation apparatus, and heat of reaction when the methane is generated in the second generation apparatus.

[Claim 8]

The hydrocarbon generation system according to any one of claims 1 to 7, wherein the hydrocarbon with two or more carbon atoms comprises an olefin with two or more and four or less carbon atoms.

[Claim 9]

The hydrocarbon generation system according to any one of claims 1 to 8, wherein a gas discharged from the first generation apparatus is supplied to the second generation apparatus with the pressure of the gas being maintained.

[Claim 10]

A hydrocarbon generation method, comprising:

a first generation step of generating a hydrocarbon with two or more carbon atoms from a first raw material containing: at least one of carbon monoxide and carbon dioxide; and hydrogen; and

a second generation step of generating methane from a second raw material containing: hydrogen; and at least one of carbon monoxide and carbon dioxide contained in the first raw material and discharged in the first generation step, wherein

in the first generation step, the hydrocarbon with two or more carbon atoms is generated from the first raw material with an iron catalyst, and

in the second generation step, the methane is generated from the second raw material with a nickel catalyst.