Claims

[Claim 1]

A catalyst in which a transition metal and carbon are supported on a carrier, and the carbon comprises fibrous carbon.

[Claim 2]

The catalyst according to claim 1, wherein a ratio of a crystallite diameter of the transition metal when the carbon comprises the fibrous carbon to a crystallite diameter of the transition metal supported on the carrier when the carbon supported on the carrier does not comprise fibrous carbon is 0.80 or less.

[Claim 3]

The catalyst according to claim 1 or 2, wherein an amount of the carbon based on the transition metal is 510% by mass or more and 2500% by mass or less.

[Claim 4]

The catalyst according to any one of claims 1 to 3, wherein the catalyst is a catalyst for alkane dehydrogenation.

[Claim 5]

The catalyst according to any one of claims 1 to 4, wherein the transition metal is Ni.

[Claim 6]

The catalyst according to any one of claims 1 to 5, wherein the carrier is at least one selected from the group consisting of silica, alumina, zirconia, and titania.

[Claim 7]

The catalyst according to any one of claims 1 to 5, wherein the carrier is γ-alumina.

[Claim 8]

A method for producing a catalyst, comprising:

forming a catalyst precursor by mixing a solution containing a transition metal compound and a carrier, and heating to remove a solvent,

bringing a carbon-containing gas into contact with the catalyst precursor to form a

ratio (W/F) of an amount of the catalyst precursor to a feed rate of the carbon-containing gas when the carbon-containing gas is brought into contact with the catalyst precursor is 0.03g • min/ml or more and 0.5g • min/ml or less.

[Claim 16]

The process for producing a catalyst according to any one of claims 8 to 15, wherein the transition metal is Ni.

[Claim 17]

The method for producing a catalyst according to any one of claims 8 to 16, wherein the carrier is at least one selected from the group consisting of silica, alumina, zirconia, and titania.

[Claim 18]

The process for producing a catalyst according to any one of claims 8 to 16, wherein the carrier is γ-alumina.

[Claim 19]

The method for producing a catalyst according to any one of claims 8 to 18, wherein a ratio of a crystallite diameter of the transition metal supported on the catalyst to a crystallite diameter of the transition metal on the catalyst precursor when the carbon-containing gas is not brought into contact is 0.80 or less.

[Claim 20]

A method for producing an unsaturated hydrocarbon, the method comprising bringing a mixed gas comprising an alkane and carbon dioxide into contact with the catalyst according to any one of claims 1 to 7 to produce an unsaturated hydrocarbon from the alkane.

[Claim 21]

The method for producing an unsaturated hydrocarbon according to claim 20, wherein in the mixed gas, a molar ratio of the carbon dioxide to the alkane is 0.1 or more and 1.9 or less.

[Claim 22]

The method for producing an unsaturated hydrocarbon according to claim 20 or 21, wherein the alkane is an alkane having 2 to 5 carbon atoms.