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(54) Title: METHOD FOR PRODUCING METHYLACETYLENE AND CATALYST

(57) Abstract: To provide a method capable of producing methylacetylene in good yield and a catalyst suited for the production method. The method for producing methylacetylene includes isomerizing propadiene in the presence of a catalyst of an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more. The catalyst used for isomerizing propadiene to produce methylacetylene is a catalyst of an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more.



DESCRIPTION

METHOD FOR PRODUCING METHYLACETYLENE AND CATALYST

5 Technical Field

The present invention relates to a method for isomerizing propadiene to produce methylacetylene and a catalyst suited for the production method.

10 Background Art

As the method for isomerizing propadiene into methylacetylene, Patent Document 1 describes a method of reacting propadiene in the presence of a catalyst of potassium carbonate supported on γ -alumina to produce methylacetylene.

15 However, such a conventional method for producing methylacetylene as described in Patent Document 1 cannot necessarily achieve satisfactory yield of methylacetylene depending on γ -alumina used.

20 Citation List

- Patent Document 1: JP-A-No. 2-290831

Summary of Invention

Technical Problem

25 An object of the present invention is to provide a method capable of producing methylacetylene in good yield and a catalyst suited for the production method.

Solution to Problem

As a result of intensive studies in order to solve the problems, the inventors of the present invention have found solution means including the following aspects, and the invention has been accomplished.

5 A method for producing methylacetylene of the present invention is characterized by that it includes isomerizing propadiene in the presence of a catalyst of an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more.

 Furthermore, a catalyst of the present invention is characterized
10 by that it is a catalyst used for isomerizing propadiene to produce methylacetylene and includes an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more.

Advantageous Effects of Invention

 The present invention has an advantageous effect capable of
15 producing methylacetylene in good yield.

Description of Embodiment

 A method for producing methylacetylene of the present invention uses a catalyst of an alkali metal compound supported on γ -alumina as
20 a carrier. The γ -alumina has an average pore radius of 4.5 nm or more and preferably 5.0 nm or more. This enables the production of methylacetylene in good yield. The reason for this is assumed as follows.

 In other words, γ -alumina having a smaller average pore radius is
25 likely to have a smaller pore volume. In the pores of γ -alumina having a smaller average pore radius, the diffusibility of propadiene as the reactant is reduced. This lowers the reactivity of propadiene on an

active site, thereby decreasing the reaction rate. In addition, in the pores of γ -alumina having a smaller average pore radius, the diffusibility of methylacetylene as the product is reduced. Hence, the methylacetylene is difficult to be removed from the active site. As a result, the active site is difficult to be in contact with the propadiene, and this lowers the reaction rate. γ -Alumina having an average pore radius of 4.5 nm or more has a moderately large pore volume. In such pores, a reactant and a product, that is, propadiene and methylacetylene are readily diffused, and this increases the reaction rate. It is assumed that methylacetylene can therefore be produced in good yield in such a condition.

The upper limit of the average pore radius is preferably 15 nm or smaller and more preferably 10 nm or smaller. The average pore radius is determined by mercury intrusion method.

The γ -alumina preferably has a pore volume of 0.40 mL/g or more and more preferably 0.50 mL/g or more. This enables the production of methylacetylene in good yield. The reason for this is assumed to be the same as the reason described in the average pore radius. The upper limit of the pore volume is preferably 2.5 mL/g or less and more preferably 1.5 mL/g or less. The pore volume is determined by mercury intrusion method.

The γ -alumina preferably has a specific surface area of 100 m²/g or more from the viewpoint of the amount of an alkali metal compound supported. The specific surface area is determined by nitrogen adsorption method (BET method) and typically determined by single point BET method.

In order to remove impurities that adhere onto a surface of the γ -

alumina thereby to activate the surface, the γ -alumina may be treated with heat before supporting an alkali metal compound. The heat treatment can be carried out in an oxidizing gas or inert gas atmosphere and can be carried out in an atmosphere in combination of these gases in a multistep process. The oxidizing gas means a gas containing an oxidizing substance. Examples of the oxidizing gas include oxygen-containing gases such as air and pure oxygen. Examples of the inert gas include a nitrogen gas, a helium gas, and an argon gas. Among the exemplified gases, the gas preferably used during the heat treatment is a nitrogen gas, an oxygen gas, air, or a mixed gas of a nitrogen gas and an oxygen gas.

The heat treatment temperature is preferably 100 to 600°C. The heat treatment time is preferably 1 to 48 hours and more preferably 2 to 24 hours.

Examples of the alkali metal compound supported on such γ -alumina include alkali metal oxides, alkali metal halides, alkali metal hydroxides, alkali metal carbonates, alkali metal nitrates, alkali metal hydrides, alkali metal alkoxides, and alkali metal acetates, and as necessary, two or more of them may be supported on γ -alumina. Among the exemplified alkali metal compounds, a potassium compound is preferred.

The amount of an alkali metal supported in the catalyst is preferably 0.01 to 6.7 mmol and more preferably 0.15 to 4.0 mmol based on 1 g of the catalyst. The amount of an alkali metal supported can be quantitatively determined, for example, by inductively coupled plasma emission spectrometry (hereinafter called "ICP analysis").

The catalyst is preferably used as a compact, and examples of the

compact shape include a spherical granular (spherical) shape, a column shape, a pellet shape, an extrusion shape, a ring shape, a honeycomb shape, and a granular shape having a moderate size by pulverization and classification after shape forming.

5 A specific surface area of the catalyst is 10-500 m²/g, preferably 20-350 m²/g. Further, it is preferable to produce a catalyst in a granular shape having a moderate size by pulverization and classification after shape forming. The pulverization of catalyst increases an efficiency of contact between the catalyst and propadiene.
10 This accelerates the isomerization of propadiene, thereby increasing the yield of methylacetylene. An average radius of a catalyst in a granular shape is 0.1-4.0mm, preferably 0.2-3.0mm.

Examples of the method for supporting an alkali metal compound on γ -alumina include a method of contact-treating γ -alumina with a
15 solution containing an alkali metal compound and a coprecipitation method. In the contact treatment, the treatment temperature is commonly 0 to 100°C and preferably 0 to 50°C, and the treatment pressure is commonly 0.1 to 1 MPa and preferably atmospheric pressure. The contact treatment can be carried out in an air
20 atmosphere or in an atmosphere of an inert gas such as a nitrogen gas, a helium gas, an argon gas, and a carbon dioxide gas. The atmosphere may contain water vapor. Specific examples of the contact treatment include impregnating, immersing, and kneading, and the solvent used for preparing the solution is preferably water.

25 The catalyst is preferably calcined after an alkali metal compound is supported on γ -alumina. By the calcination, an alkali metal compound (except alkali metal oxides) supported can be converted into

an alkali metal oxide. In the case of calcination, the alkali metal compound preferably used to be supported are thermally degradable salts such as carbonates, nitrates, acetates, hydroxides, and halides. Among them, carbonates are preferred.

5 The calcination can be carried out in an oxidizing gas, reducing gas, or inert gas atmosphere and may be carried out in an atmosphere in combination of these gases in a multistep process. Examples of the oxidizing gas and the inert gas include the same gases as those exemplified in the heat treatment of γ -alumina. The reducing gas
10 means a gas containing a reducing substance. Examples of the reducing gas include a hydrogen-containing gas, a carbon monoxide-containing gas, and a hydrocarbon-containing gas. Among the exemplified gases, the gas preferably used during the calcination is a nitrogen gas, an oxygen gas, air, or a mixed gas of a nitrogen gas and
15 an oxygen gas.

 The calcination temperature is preferably 500 to 900°C and more preferably 550 to 700°C. The calcination time is preferably 0.5 to 48 hours and preferably 2 to 24 hours.

 The catalyst is preferably dried before calcination. When water is
20 removed by rapid heating, for example, by calcination, an alkali metal compound supported may move together with water that moves from the inside of γ -alumina, and this may cause an uneven support state of the alkali metal compound. Drying a catalyst before calcination thereby to moderately remove water can prevent the alkali metal compound
25 from moving during calcination, and this can achieve an even support state of the catalyst.

 As the drying method, a conventionally known method can be

adopted. The temperature for drying is commonly from room temperature to about 100°C, and the pressure is commonly 0.001 to 1 MPa and preferably atmospheric pressure. The drying can be carried out in an air atmosphere or in an atmosphere of an inert gas such as a nitrogen gas, a helium gas, an argon gas, and a carbon dioxide gas. The atmosphere may contain water vapor.

In the present invention, in the presence of the catalyst described above, propadiene is isomerized thereby to afford methylacetylene. The isomerization may be carried out in a batch system, in a semi-batch system, or in a continuous system. The temperature during the isomerization is commonly -30 to 600°C and preferably 0 to 100°C, and the pressure is commonly 0.1 to 10 MPa.

The isomerization may be carried out in an inert gas atmosphere or in an oxidizing gas atmosphere. Examples of the inert gas and the oxidizing gas include the same gases as those exemplified in the heat treatment of γ -alumina. In the case of isomerization in a continuous system, an inert gas or an oxidizing gas may be supplied together with a raw material. In a continuous system reaction, for example, a fixed bed system can be adopted in a liquid phase condition for the isomerization.

The amount of the catalyst is, in terms of alkali metal element in the catalyst, preferably 0.0001 to 0.1 mol and more preferably 0.001 to 0.05 mol with respect to 1 mol of propadiene.

In the isomerization, an organic solvent may be used. Examples of the organic solvent include aliphatic hydrocarbons such as methane, ethane, propane, butane, pentane, hexane, and octane; alicyclic hydrocarbons such as cyclopentane and cyclohexane; aromatic hydrocarbons such as benzene, toluene, and xylene; and aprotic polar

solvents such as N,N-dimethylformamide and N,N-dimethylacetamide. Two or more of these solvents may be used as necessary. Among the exemplified organic solvents, aliphatic hydrocarbons are preferred and propane is more preferred.

5 The isomerization is preferably carried out in a condition substantially free from water and carbon dioxide. Such a condition can suppress the deterioration of the catalytic activity.

 After-treatment operation after the reaction is appropriately selected. By operation such as distillation, methylacetylene and
10 propadiene can be separated.

Examples

 The present invention will be described in further detail with reference to examples hereinafter, but the invention is not limited to these examples.

15 In the Examples and Comparative Examples below, the average pore radius and the pore volume of γ -alumina were determined as follows.

<Determination Method of Average Pore Radius and Pore Volume>

γ -Alumina was dried at 120°C for 4 hours, and then the average
20 pore radius and the pore volume were determined using a porosimeter "AutoPore III 9420" manufactured by MICROMERITICS by mercury intrusion method.

Example 1

<Preparation of Catalyst>

25 As the carrier, spherical γ -alumina (an average pore radius of 5.0 nm, a pore volume of 0.50 mL/g, 2.0 to 4.0 mm spheres) was used. First, the carrier was heat-treated in an air atmosphere in a condition of

a heat treatment temperature of 500°C and a heat treatment time of 16 hours.

Next, the heat-treated γ -alumina was subjected to contact treatment with a solution containing an alkali metal compound.

5 Specifically, 9.95 g of the heat-treated γ -alumina was impregnated with an aqueous solution prepared by dissolving 2.55 g of potassium carbonate " K_2CO_3 " manufactured by Wako Pure Chemical Industries, Ltd. in 5.01 g of pure water. The contact treatment was carried out in an air atmosphere at a treatment temperature of 23°C and a treatment
10 pressure of atmospheric pressure.

Next, the potassium carbonate supported on γ -alumina obtained by the contact treatment was dried before calcination. The drying was carried out by air-drying the potassium carbonate supported on γ -alumina in an air atmosphere in a condition of a temperature of 20 to
15 30°C, a pressure of atmospheric pressure, and a drying time of 15 hours or more.

Next, the dried potassium carbonate supported on γ -alumina was calcined in a nitrogen gas stream while raising the temperature from room temperature (23°C) to 620°C over 1 hour and maintaining the
20 same temperature for 6 hours, thereby affording a catalyst (A) of potassium supported on spherical γ -alumina shown in Table 1. The amount of potassium supported of the obtained catalyst (A) was determined using an inductively coupled plasma emission spectrometry "ICPS-8100" manufactured by Simadzu Corporation by ICP analysis.
25 The amount of potassium supported was 2.81 mmol based on 1 g of catalyst. Further, the specific surface area of the catalyst(A) determined by BET method was 127 m²/g.

<Evaluation of Catalytic Activity>

First, in a nitrogen gas atmosphere in a glove box, into a 100-mL stainless steel (SUS) autoclave, 0.62 g of the obtained catalyst (A) was introduced. Next, the inside of the autoclave was decompressed to -0.1 MPaG, and then 7.45 g of propadiene, 67.9 mg of methylacetylene, and 15.68 g of propane as an organic solvent were introduced into the autoclave while cooling the autoclave in an ethanol/dry ice bath. Then, the reaction was carried out at room temperature (23°C) at 0.9 MPa (absolute pressure) for 2 hours while stirring the mixture in the autoclave and propadiene was isomerized in the presence of the catalyst (A).

Each of the propadiene, the methylacetylene, and the propane was introduced from a cylinder into the autoclave. Each amount of the propadiene, the methylacetylene, and the propane charged was calculated from the reduction of the cylinder weight. Here, 67.9 mg of methylacetylene introduced into the autoclave was an impurity contained in the propadiene.

Each of the propadiene, the methylacetylene, and the propane was introduced from a cylinder into the autoclave in a gaseous state. The autoclave was cooled in an ethanol/dry ice bath (at about -65°C). Thus, each of the propadiene, the methylacetylene, and the propane was in a liquid state immediately after the introduction into the autoclave. The reaction was carried out in a pressurized condition. Thus, most of the propadiene, the methylacetylene, and the propane remained in a liquid state during the reaction, and hence the reaction was a liquid-phase reaction.

After the reaction, the reaction solution was analyzed by gas

chromatography and a propadiene conversion rate (hereinafter also called "PD conversion rate") (%), a methylacetylene/propadiene retention rate (hereinafter also called "MA/PD retention rate") (%), a methylacetylene formation amount based on 1 g of catalyst (hereinafter also called "MA formation amount") (g-MA/g-cat.), and a methylacetylene yield (hereinafter also called "MA yield") (%) were determined. Table 1 shows the results.

The PD conversion rate (%) was calculated in accordance with the equation: [mole number of propadiene reacted/mole number of propadiene supplied] $\times$ 100.

The MA/PD retention rate (%) was calculated in accordance with the equation: [total mole number of methylacetylene and propadiene in product/total mole number of methylacetylene and propadiene in raw material] $\times$ 100.

The MA formation amount (g-MA/g-cat.) was calculated in accordance with the equation: [methylacetylene formation amount (g)/catalyst weight (g)].

The MA yield (%) was calculated in accordance with the equation: [mole number of methylacetylene formed/mole number of propadiene supplied] $\times$ 100.

Example 2

<Preparation of Catalyst>

As the carrier, spherical γ -alumina (an average pore radius of 5.0 nm, a pore volume of 0.57 mL/g, 2.0 to 4.0 mm spheres) was used. First, the carrier was subjected to heat treatment in a similar manner to that in Example 1.

Next, the heat-treated γ -alumina was subjected to contact

treatment with a solution containing an alkali metal compound. The contact treatment was carried out in a similar manner to that in Example 1 except that 10.04 g of the heat-treated γ -alumina was impregnated with an aqueous solution prepared by dissolving 2.66 g of potassium carbonate " K_2CO_3 " manufactured by Wako Pure Chemical Industries, Ltd. in 3.05 g of pure water.

Then, the potassium carbonate supported on γ -alumina that was obtained by the contact treatment was dried and then calcined in a similar manner to that in Example 1, thereby affording a catalyst (B) of potassium supported on spherical γ -alumina shown in Table 1. The amount of potassium supported of the obtained catalyst (B) was determined in a similar manner to that in Example 1. The amount of potassium supported was 3.07 mmol based on 1 g of catalyst. Further, the specific surface area of the catalyst(B) determined by BET method was 146 m^2/g .

<Evaluation of Catalytic Activity>

The catalytic activity was evaluated in a similar manner to that in Example 1 except that 0.63 g of the catalyst (B) was used in place of the catalyst (A) and 7.41 g of propadiene, 64.2 mg of methylacetylene, and 15.48 g of propane were introduced into the autoclave. Table 1 shows the results.

Example 3

<Preparation of Catalyst>

As the carrier, spherical γ -alumina (an average pore radius of 6.6 nm, a pore volume of 0.60 mL/g, 2.0 to 4.0 mm spheres) was used. First, the carrier was subjected to heat treatment in a similar manner to that in Example 1.

Next, the heat-treated γ -alumina was subjected to contact treatment with a solution containing an alkali metal compound. The contact treatment was carried out in a similar manner to that in Example 1 except that 8.65 g of the heat-treated γ -alumina was
5 impregnated with an aqueous solution prepared by dissolving 2.18 g of potassium carbonate " K_2CO_3 " manufactured by Wako Pure Chemical Industries, Ltd. in 4.38 g of pure water.

Then, the potassium carbonate supported on γ -alumina that was obtained by the contact treatment was dried and then calcined in a
10 similar manner to that in Example 1, thereby affording a catalyst (C) of potassium supported on spherical γ -alumina shown in Table 1. The amount of potassium supported of the obtained catalyst (C) was determined in a similar manner to that in Example 1. The amount of potassium supported was 2.81 mmol based on 1 g of catalyst. Further,
15 the specific surface area of the catalyst(C) determined by BET method was 100 m²/g.

<Evaluation of Catalytic Activity>

The catalytic activity was evaluated in a similar manner to that in Example 1 except that 0.60 g of the catalyst (C) was used in place of the
20 catalyst (A) and 7.09 g of propadiene, 68.5 mg of methylacetylene, and 15.85 g of propane were introduced into the autoclave. Table 1 shows the results.

Example 4

<Preparation of Catalyst>

25 As the carrier, spherical γ -alumina (an average pore radius of 7.7 nm, a pore volume of 0.70 mL/g, 3.0 to 5.0 mm spheres) was used. First, the carrier was subjected to heat treatment in a similar manner to

that in Example 1.

Next, the heat-treated γ -alumina was subjected to contact treatment with a solution containing an alkali metal compound. The contact treatment was carried out in a similar manner to that in
5 Example 1 except that 8.77 g of the heat-treated γ -alumina was impregnated with an aqueous solution prepared by dissolving 2.21 g of potassium carbonate " K_2CO_3 " manufactured by Wako Pure Chemical Industries, Ltd. in 3.22 g of pure water.

Then, the potassium carbonate supported on γ -alumina that was
10 obtained by the contact treatment was dried and then calcined in a similar manner to that in Example 1, thereby affording a catalyst (D) of potassium supported on spherical γ -alumina shown in Table 1. The amount of potassium supported of the obtained catalyst (D) was determined in a similar manner to that in Example 1. The amount of
15 potassium supported was 3.07 mmol based on 1 g of catalyst. Further, the specific surface area of the catalyst(D) determined by BET method was $87.8 \text{ m}^2/\text{g}$.

<Evaluation of Catalytic Activity>

The catalytic activity was evaluated in a similar manner to that in
20 Example 1 except that 0.60 g of the catalyst (D) was used in place of the catalyst (A) and 9.60 g of propadiene, 15.0 mg of methylacetylene, and 16.85 g of propane were introduced into the autoclave. Table 1 shows the results.

Comparative Example 1.

<Preparation of Catalyst>

25

As the carrier, spherical γ -alumina (an average pore radius of 4.2 nm, a pore volume of 0.37 mL/g, 2.0 to 4.0 mm spheres) was used.

First, the carrier was subjected to heat treatment in a similar manner to that in Example 1.

Next, the heat-treated γ -alumina was subjected to contact treatment with a solution containing an alkali metal compound. The contact treatment was carried out in a similar manner to that in Example 1 except that 7.74 g of the heat-treated γ -alumina was impregnated with an aqueous solution prepared by dissolving 1.95 g of potassium carbonate " K_2CO_3 " manufactured by Wako Pure Chemical Industries, Ltd. in 2.66 g of pure water.

Then, the potassium carbonate supported on γ -alumina that was obtained by the contact treatment was dried and then calcined in a similar manner to that in Example 1, thereby affording a catalyst (E) of potassium supported on spherical γ -alumina shown in Table 1. The amount of potassium supported of the obtained catalyst (E) was determined in a similar manner to that in Example 1. The amount of potassium supported was 2.81 mmol based on 1 g of catalyst. Further, the specific surface area of the catalyst(E) determined by BET method was 92.5 m²/g.

<Evaluation of Catalytic Activity>

The catalytic activity was evaluated in a similar manner to that in Example 1 except that 0.61 g of the catalyst (E) was used in place of the catalyst (A) and 7.42 g of propadiene, 69.9 mg of methylacetylene, and 15.96 g of propane were introduced into the autoclave. Table 1 shows the results.

Table 1

Table 1

	Catalyst			Activity evaluation result 1)			
	Compositi on	Average pore radius of γ -alumina (nm)	Pore volume of γ -alumina (mL/g)	PD conversio n rate (%)	MA/PD retention rate (%)	MA formation amount (g-MA/g-cat.)	MA yield (%)
Example 1	(A)	5.0	0.50	32.8	99.9	3.95	32.7
Example 2	(B)	5.0	0.57	28.8	100.0	3.39	28.7
Example 3	(C)	6.6	0.60	30.8	99.9	3.65	30.7
Example 4	(D)	7.7	0.70	29.8	100.0	4.80	29.8
Comparati ve Example 1	(E)	4.2	0.37	22.5	100.0	2.75	22.5

1) PD, MA, and cat. represent propadiene, methylacetylene, and catalyst, respectively.

As apparent from Table 1, Examples 1 to 4 in which propadiene was isomerized in the presence of the catalyst of an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more showed better results in the evaluation of catalytic activity than that of Comparative Example 1 in which the γ -alumina had an average pore radius of less than 4.5 nm. The results reveal that the catalysts in Examples 1 to 4 have high productivity of methylacetylene per unit catalyst and can produce methylacetylene in good yield.

Example 5

<Preparation of Catalyst>

As the carrier, spherical γ -alumina (an average pore radius of 6.4 nm, a pore volume of 0.60 mL, a BET surface area of 106 m²/g, 2.0 to 4.0 mm spheres) was used. First, the carrier was subjected to heat treatment in a similar manner to that in Example 1.

Next, the heat-treated γ -alumina was subjected to contact treatment with a solution containing an alkali metal compound. The contact treatment was carried out in a similar manner to that in Example 1 except that 28.61 g of the heat-treated γ -alumina was impregnated with an aqueous solution prepared by dissolving 7.20 g of potassium carbonate "K₂CO₃" manufactured by Wako Pure Chemical Industries, Ltd. in 14.47 g of pure water.

Next, the potassium carbonate supported on γ -alumina that was obtained by the contact treatment was dried in a similar manner to that in Example 1. Then, the dried potassium carbonate supported on γ -alumina was calcined in an air stream while raising the temperature from room temperature (23°C) to 620°C over 1 hour and maintaining the same temperature for 6 hours.

Finally, the calcined product was pulverized and granulated, thereby affording a catalyst (F) of potassium supported on γ -alumina in a granular form having a radius of 0.5-1.7mm. The amount of potassium supported in the obtained catalyst (F) was determined using an ICP emission spectrometer "ICPS-8100" manufactured by Shimadzu Corporation by ICP analysis. The amount of potassium supported was 2.56 mmol based on 1 g of catalyst. Further, the specific surface area of the catalyst(A) determined by BET method was 51.9 m²/g.

<Evaluation of Catalytic Activity>

First, in a nitrogen gas atmosphere in a glove box, into a 100-mL SUS autoclave, 0.60 g of the obtained catalyst (F) was introduced. Next, the inside of the autoclave was decompressed to -0.1 MPaG, and then 7.04 g of propadiene, 9.6 mg of methylacetylene, and 14.14 g of propane were introduced into the autoclave while cooling the autoclave in an ethanol/dry ice bath. Then, the reaction was carried out at 30°C at 1.1 MPa (absolute pressure) for 2 hours while stirring the mixture in the autoclave and propadiene was isomerized in the presence of the catalyst (F).

Next, the reaction solution was analyzed by gas chromatography and the propadiene conversion rate (%), the methylacetylene/propadiene retention rate (%), the methylacetylene yield (%), and the methylacetylene formation amount (g-MA/g-cat.) were determined on the basis of the equations described in Example 1. The results are shown below.

Propadiene conversion rate (%): 78.6

Methylacetylene/propadiene retention rate (%): 99.5

Methylacetylene yield (%): 78.4

Methylacetylene formation amount (g-MA/g-cat.): 9.16

As apparent from these results, a catalyst that is pulverized and classified after shape forming into a granular form having a moderate size can improve the yield of methylacetylene.

CLAIMS

1. A method for producing methylacetylene, the method comprising isomerizing propadiene in the presence of a catalyst of an alkali metal compound supported on γ -alumina having an average pore radius of 4.5
5 nm or more.
2. The production method according to claim 1, wherein the γ -alumina has a pore volume of 0.40 mL/g or more.
3. The production method according to claim 1 or claim 2, wherein the alkali metal compound is a potassium compound.
- 10 4. The production method according to any one of claims 1 to 3, wherein the catalyst is obtained by contact-treating the γ -alumina having an average pore radius of 4.5 nm or more with a solution containing the alkali metal compound and then calcining the alkali metal compound supported on the γ -alumina.
- 15 5. A catalyst used for isomerizing propadiene to produce methylacetylene, the catalyst comprising an alkali metal compound supported on γ -alumina having an average pore radius of 4.5 nm or more.