CLAIMS

1. A method for producing a catalyst for (meth)acrylic acid production containing at least molybdenum and phosphorus as catalyst components, the catalyst for (meth)acrylic acid production being used for producing (meth)acrylic acid through gas phase catalytic oxidation of (meth)acrolein using molecular oxygen,

the method comprising:

(1) a step of mixing a contactant of a catalyst component-containing catalyst precursor, a liquid and a binder so as to produce a mixture;

(2) a step of molding the mixture so as to produce a molded product; and

(3) a step of heat-treating the molded product,

wherein during a period after producing the contactant in Step (1) and before producing the molded product

in Step (2), at least one of the contactant and the mixture is kept for a total 2 hours or more at a temperature of 10°C or higher, and

if the liquid content in the mixture, which is calculated from the charged quantities in Step (1), is denoted by α% and the liquid content in the mixture immediately before carrying out the molding in Step (2) is denoted by β%, the rate of change in the liquid content, as calculated using following Formula (I), is -10% to 10%:

$$\text{Rate of change in liquid content (\%)} = (\alpha - \beta)/\alpha \times 100 \quad \text{(I)}$$

[wherein α represents the liquid content on a wet basis, calculated using following Formula (II) from the mass a of the liquid charged into Step (1) and the total mass b of the catalyst precursor and the binder:

$$\alpha = a/(a + b) \times 100 \quad \text{(II); and}$$

β represents the liquid content calculated using following Formula (III) from the mass c (g) obtainable after 10 g of the mixture in a state of immediately before carrying

out the molded in Step (2) is dried at normal pressure and at 100°C for 30 minutes:

$$\beta = (10 - c)/10 \times 100 \qquad \text{(III)}].$$

2. The method for producing a catalyst for (meth)acrylic acid production according to claim 1, wherein the rate of change in the liquid content calculated using Formula (I) is from 0% to 10%.

3. The method for producing a catalyst for (meth)acrylic acid production according to claim 1 or 2, wherein during a period after producing the contactant in Step (1) and before producing the molded product in Step (2), at least one of the contactant and the mixture is kept for a total 2 hours or more and 48 hours or less at a temperature of 10°C or higher.

4. The method for producing a catalyst for (meth)acrylic acid production according to claim 1 or 2, wherein during a period after producing the contactant in Step (1) and before producing the molded product in Step (2), at least one of the contactant and the mixture is kept for a total 2 hours or more at a temperature of 10°C or higher and 40°C or lower.

5. The method for producing a catalyst for (meth)acrylic acid production according to any one of claims 1 to 4, wherein at least one conveying process is included between the various steps from Step (1) to Step (3).

6. The method for producing a catalyst for (meth)acrylic acid production according to claim 5, wherein the conveying process is included between Step (1) and Step (2).

7. The method for producing a catalyst for (meth)acrylic acid production according to claim 5 or 6, wherein the conveying process is carried out using a conveying machine.

8. The method for producing a catalyst for (meth)acrylic acid production according to claim 7, wherein in the conveying process, conveyance is performed by means of a screw type conveying machine, a belt conveyor type conveying machine, a chain conveyor type conveying machine, a roller conveyor type conveying machine, a vibration type conveying machine, an extrusion type conveying machine, or a dropping type conveying machine.

9. The method for producing a catalyst for (meth)acrylic acid production according to any one of claims 1 to 8, wherein in Step (2), molding of the mixture is performed using an extruding machine.

10. The method for producing a catalyst for (meth)acrylic acid production according to any one of claims 1 to 9, wherein the catalyst for methacrylic acid production is a composite oxide having a composition represented using following Formula (IV):

$$P_aMo_bV_cCu_dX_eY_fZ_gO_h \quad (IV)$$

[wherein in Formula (IV), P, Mo, V, Cu, and O represent phosphorus, molybdenum, vanadium, copper, and oxygen, respectively; X represents at least one element selected from the group consisting of arsenic, antimony, and tellurium; Y represents at least one element selected from the group consisting of bismuth, germanium, zirconium, silver, selenium, silicon, tungsten, boron, iron, zinc, chromium, magnesium, tantalum, cobalt, manganese, barium, gallium, cerium, and lanthanum; Z

represents at least one element selected from the group consisting of potassium, rubidium, and cesium; a, b, c, d, e, f, g, and h respectively represent the atomic ratios of the various elements; and when b = 12, a = 0.1 to 3, c = 0.01 to 3, d = 0.01 to 2, e = 0 to 3, f = 0 to 3, g = 0.01 to 3, and h represents the atomic ratio of oxygen required for satisfying the valences of the various elements].

11. The method for producing a catalyst for (meth)acrylic acid production according to any one of claims 1 to 9, wherein the catalyst for acrylic acid production is a composite oxide having a composition represented using following Formula (V):

$$P_iMo_jV_kA_lX^2_mY^2_nO_o \qquad (V)$$

[wherein in Formula (V), P, Mo, V, and O represent phosphorus, molybdenum, vanadium, and oxygen, respectively; A represents at least one element selected from the group consisting of iron, cobalt, chromium, aluminum, and strontium; X^2 represents at least one element selected from the group consisting of germanium, boron, arsenic, selenium, silver, silicon, sodium, tellurium, lithium, antimony, potassium, and barium; Y^2 represents at least one element selected from the group consisting of magnesium, titanium, manganese, copper, zinc, zirconium, niobium, tungsten, tantalum, calcium, tin, and bismuth; i, j, k, l, m, n, and o respectively represent the atomic ratios of the various elements; and when j = 12, i = 0.01 to 10, k = 0.01 to 6, l = 0 to 5, m = 0 to 10, n = 0 to 5, and o represents the atomic ratio of oxygen required for satisfying the valences of the various components].

12. A method for producing (meth)acrylic acid, the method comprising producing a catalyst for (meth)acrylic acid production by the method for producing a catalyst for (meth)acrylic acid production according to any one of claims 1 to 11, and producing

(meth)acrylic acid through gas phase catalytic oxidation of (meth)acrolein using molecular oxygen in the presence of the catalyst.