Claims

1. An Mo-, Bi- and Fe-comprising multimetal oxide composition of the general stoichiometry I,

$$Mo_{12}\ Bi_a\ Co_b\ Fe_c\ K_d\ Si_e\ O_x \quad (I),$$

where the variables have the following meanings:

a = 0.5 to 1,
b = 7 to 8.5,
c = 1.5 to 3.0,
d = 0 to 0.15,
e = 0 to 2.5 and
x = a number which is determined by the valence and abundance of the elements other than oxygen in I

and fulfil the following conditions:

condition 1: $12 - b - 1.5 \cdot c = A$,
and
$0.5 \leq A \leq 1.5$;

condition 2: $0.2 \leq a/A \leq 1.3$; and

condition 3: $2.5 \leq b/c \leq 9$.

2. The multimetal oxide composition according to claim 1 whose stoichiometric coefficient d is from 0.04 to 0.1.

3. The multimetal oxide composition according to any of claims 1 and 2 whose stoichiometric coefficient e is from 0.5 to 2.

4. The multimetal oxide composition according to any of claims 1 to 3 which fulfils the condition 1, $0.5 \leq A \leq 1.25$.

5. The multimetal oxide composition according to any of claims 1 to 4, which fulfils the condition 2, $0.3 \leq a/A \leq 1.2$.

6. The multimetal oxide composition according to any of claims 1 to 5, which fulfils the condition 3, $3 \leq b/c \leq 9$.

7. A coated catalyst comprising a shaped support body and a coating of at least one multimetal oxide composition according to any of claims 1 to 6 present on the outer surface of the shaped support body.

8. An all-active shaped catalyst body whose active composition is at least one multimetal oxide according to any of claims 1 to 6.

9. The all-active shaped catalyst body according to claim 8 which has the geometry of a ring having a wall thickness of from 1 to 3 mm, a length of from 2 to 10 mm and an external diameter of from 2 to 10 mm.

10. A process for preparing a multimetal oxide composition according to any of claims 1 to 6, wherein a finely divided dry mix is produced from sources of elemental constituents of the multimetal oxide composition and this mixture is calcined at temperatures in the range from 350 to 650°C.

11. The process for the heterogeneously catalyzed gas-phase oxidation of an alkane, alkanol, alkanal, alkene and/or alkenal having from 3 to 6 carbon atoms over a catalyst bed, wherein the catalyst bed comprises at least one multimetal oxide composition according to any of claims 1 to 6 or at least one catalyst according to any of claims 7 to 9 or at least one product of a process according to claim 10.

12. The process according to claim 11, which is a process for the heterogeneously catalyzed partial gas-phase oxidation of propene to acrolein.

13. The use of at least one multimetal oxide according to any of claims 1 to 6 or of at least one catalyst according to any of claims 7 to 9 or of at least one product of a process according to claim 10 for the catalysis of a process for the heterogeneously catalyzed partial gas-phase oxidation of an alkane, alkanol, alkanal, alkene and/or alkenal having from 3 to 6 carbon atoms over a catalyst bed.

Claims

1. An Mo-, Bi- and Fe-comprising multimetal oxide composition of the general stoichiometry I,

$$Mo_{12}Bi_aCo_bFe_cK_dSi_eO_x \qquad (I),$$

where the variables have the following meanings:

a=0.5 to 1,
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d=0 to 0.15,
e=0 to 2.5 and
x=a number which is determined by the valence and abundance of the elements other than oxygen in I and fulfil the following conditions:

$12-b-1.5\cdot c=A,$

and

$0.5 \leq A \leq 1.5;$ condition 1

$0.2 \leq a/A \leq 1.3;$ and condition 2

$2.5 \leq b/c \leq 9.$ condition 3

2. The multimetal oxide composition according to claim 1 whose stoichiometric coefficient d is from 0.04 to 0.1.

3. The multimetal oxide composition according to any of claims 1 and 2 whose stoichiometric coefficient e is from 0.5 to 2.

4. The multimetal oxide composition according to claim 1, which fulfils the condition 1, 0.5 ≤A ≤1.25.

5. The multimetal oxide composition according to claim 1, which fulfils the condition 2, $0.3 \leq a/A \leq 1.2$.

6. The multimetal oxide composition according to claim 1, which fulfils the condition 3, $3 \leq b/c \leq 9$.

7. A coated catalyst comprising a shaped support body and a coating of at least one multimetal oxide composition according to claim 1 present on the outer surface of the shaped support body.

8. An all-active shaped catalyst body whose active composition is at least one multimetal oxide according to claim 1.

9. The all-active shaped catalyst body according to claim 8 which has the geometry of a ring having a wall thickness of from 1 to 3 mm, a length of from 2 to 10 mm and an external diameter of from 2 to 10 mm.

10. A process for preparing a multimetal oxide composition according to claim 1, wherein a finely divided dry mix is produced from sources of elemental constituents of the multimetal oxide composition and this mixture is calcined at temperatures in the range from 350 to 650°C.

11. A process, comprising oxidizing an alkane, alkanol, alkanal, alkene and/or alkenal having from 3 to 6 carbon atoms over a catalyst bed, wherein the catalyst bed comprises at least one multimetal oxide composition according to claim 1.

12. The process according to claim 11, which is a process for the heterogeneously catalyzed partial gas-phase oxidation of propene to acrolein.

13. A process, comprising oxidizing an alkane, alkanol, alkanal, alkene and/or alkenal having from 3 to 6 carbon atoms over a catalyst bed, wherein the catalyst bed comprises at least one catalyst according to claim 7.

14. A process, comprising oxidizing an alkane, alkanol, alkanal, alkene and/or alkenal having from 3 to 6 carbon atoms over a catalyst bed, wherein the catalyst bed comprises at least one multimetal oxide composition obtained by the process according to claim 10.