Patent claims

1. A process for the preparation of methionine comprising the step of contacting a solution or suspension comprising 2-amino-4-(methylthio)butanenitrile and/or 2-amino-4-(methylthio)butaneamide with water in the presence of a catalyst to give a methionine comprising mixture, wherein the catalyst comprises CeO_2 comprising particles, wherein the CeO_2 comprising particles have a BET surface area of from 175 to 300 +/- 10% m^2/g measured according to DIN ISO 9277-5 (2003), a mean maximum Feret diameter $x_{Fmax, mean}$ of from 3 +/- 10% to 40 +/- 10% nm and a mean minimum Feret diameter $x_{Fmin, mean}$ of from 2 +/- 10% to 30 +/- 10% nm, both measured according to DIN ISO 9276-6 (2012), wherein the CeO_2 comprising particles have a mean aspect ratio $x_{Fmin, mean}$ / $x_{Fmax, min}$ of from 0.55 +/- 10% to 0.80 +/- 10%, measured according to DIN ISO 9276-6 (2012).

2. The process according to claim 1, wherein the catalyst comprises from 25 to 100 wt.-% of the CeO_2, based on the total weight of the catalyst.

3. The process according to claim 1 or 2, wherein the CeO_2 comprising particles comprise from 50 to 100 wt.-% of CeO_2.

4. The process according to any of claims 1 to 3, wherein the BET surface area of the CeO_2 comprising particles ranges from 225 +/- 10% to 265 +/- 10% m^2/g.

5. The process according to any of claims 1 to 4, wherein the mean minimum Feret diameter $x_{Fmin, mean}$ of the CeO_2 comprising particles is always smaller than the mean maximum Feret diameter $x_{Fmax, mean}$ of said particles.

6. The process according to any of claims 1 to 5, wherein the CeO_2 comprising particles have a lattice plane distance of from 0.24 +/- 10% to 0.32 +/- 10% nm.

7. The process according to any of claims 1 to 6, wherein the CeO_2 comprising particles comprise octahedral particles.

8. The process according to any of claims 1 to 7, wherein the CeO_2 comprising particles have a mean equivalent circular diameter $x_{A, mean}$ of from 3 +/- 10% to 30 +/- 10% nm, measured according to DIN ISO 9276-6 (2012).

9. The process according to any of claims 1 to 8, wherein the CeO_2 comprising particles have a crystallinity of at least 50%.

10. The process according to any of claims 1 to 9, wherein the contacting step is performed at a temperature of 90°C at the most with a 2-amino-4-(methylthio)butanenitrile comprising solution or suspension.

11. The process according to any of claims 1 to 10, wherein the methionine comprising mixture obtained from a contacting step is fed to at least one further contacting step.

12. The process according to claim 11, wherein the at least one further contacting step is performed at a temperature ranging from 70 to 140°C.

13. The process according to any of claims 1 to 12, wherein the process further comprises the step of separating the catalyst from the methionine comprising mixture by a continuous cross flow filtration.

14. The process according to any of claims 1 to 13, wherein the at least one contacting step is accompanied by a vacuum distillation or by stripping of the reaction solution or suspension with water vapor.