

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 CeO₂ comprising particles, wherein the CeO₂ comprising particles comprise from 50 to 100 wt.-% of CeO₂, have a BET surface area of from 35 to 65 m²/g measured according to DIN ISO 9277-5 (2003), a mean maximum Feret diameter $x_{Fmax, mean}$ of from 10 to 40 nm and a mean minimum Feret diameter $x_{Fmin, mean}$ of from 5 to 30 nm, both 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 CeO₂, based on the total weight of the catalyst.
3. The process according to any of claims 1 to 2, wherein the CeO₂ comprising particles have a mean minimum Feret diameter $x_{Fmin, mean}$ of from 9 to 25 nm.
4. The process according to any of claims 1 to 3, wherein the CeO₂ comprising particles have a mean maximum Feret diameter $x_{Fmax, mean}$ of from 13 to 36 nm.
5. The process according to any of claims 1 to 4, wherein the mean minimum Feret diameter $x_{Fmin, mean}$ of the CeO₂ 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 CeO₂ comprising particles have a mean aspect ratio $x_{Fmin, mean} / x_{Fmax, min}$ of from 0.55 to 0.85, measured according to DIN ISO 9276-6 (2012).
7. The process according to any of claims 1 to 6, wherein the CeO₂ comprising particles have a lattice plane distance of from 0.24 to 0.32 nm.
8. The process according to any of claims 1 to 7, wherein the CeO₂ comprising particles comprise octahedral particles.
9. The process according to any of claims 1 to 8, wherein the CeO₂ comprising particles have a mean equivalent circular diameter $x_{A, mean}$ of from 5 to 45 nm, measured according to DIN ISO 9276-6 (2012).
10. The process according to any of claims 1 to 9, wherein the CeO₂ comprising particles have a crystallinity of at least 50 %.

11. The process according to any of claims 1 to 10, 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.
- 5 12. The process according to any of claims 1 to 11, wherein the methionine comprising mixture obtained from a contacting step is fed to at least one further contacting step.
13. The process according to claim 12, wherein the at least one further contacting step is performed at a temperature ranging from 70 to 140°C.
- 10 14. The process according to any of claims 1 to 13, wherein the process further comprises the step of separating the catalyst from the methionine comprising mixture by a continuous cross-flow filtration.
- 15 15. The process according to any of claims 1 to 14, 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.