Claims

1. A method for conditioning a DMC catalyst, comprising heating a suspension of the DMC catalyst in a dispersing medium under a gas atmosphere, the gas being selected from the group consisting of nitrogen, carbon monoxide, carbon dioxide, water, and noble gases, at a temperature in the range of from 140 to 270°C, and a pressure of 1 to 300 bar, for a period of time in the range of from 1 min to 24 hrs.

2. The method of claim 1, wherein the suspension is stirred at >0 to 3,000 rpm.

3. The method of claim 1 or 2, wherein the suspension is stirred using a stirring power of >0 to 5 W/l

4. The method of any one of claims 1 to 3, wherein the DMC catalyst has the formula:

$$M^1_a[M^2(CN)_b(A)_c]_d \odot f M^1_g X_n \odot h(H_2O) \odot eL \odot kP$$

wherein

M^1 is a metal ion selected from the group consisting of Zn^{2+}, Fe^{2+}, Co^{3+}, Ni^{2+}, Mn^{2+}, Co^{2+}, Sn^{2+}, Pb^{2+}, Mo^{4+}, Mo^{6+}, Al^{3+}, V^{4+}, V^{5+}, Sr^{2+}, W^{4+}, W^{6+}, Cr^{2+}, Cr^{3+}, Cd^{2+}, La^{3+}, Ce^{3+}, Ce^{4+}, Eu^{3+}, Mg^{2+}, Ti^{3+}, Ti^{4+}, Ag^{+}, Rh^{1+}, Ru^{2+}, Ru^{3+}, Pd^{2+};

M^2 is a metal ion selected from the group consisting of Fe^{2+}, Fe^{3+}, Co^{2+}, Co^{3+}, Mn^{2+}, Mn^{3+}, V^{4+}, V^{5+}, Cr^{2+}, Cr^{3+}, Rh^{3+}, Ru^{2+}, Ir^{3+};

and M^1 and M^2 are different;

A is an anion selected from the group consisting of halide, hydroxide, sulfate, carbonate, cyanide, thiocyanate, isocyanate, cyanate, carboxylate, oxalate and nitrate;

X is an anion selected from the group consisting of halide, hydroxide, sulfate, carbonate, cyanide, thiocyanate, isocyanate, cyanate, carboxylate, oxalate and nitrate;

L is a water-miscible ligand selected from the group consisting of alcohols, aldehydes, ketones, ethers, polyethers, esters, polyesters, polycarbonate, ureas, amides, nitriles and sulfides and mixtures thereof;

P is an organic additive selected from the group consisting of polyethers, polyesters, polycarbonates, polyalkylene glycol sorbitan esters, polyalkylene glycol glycidyl ethers, polyacrylamide, poly(acrylamide-co-acrylic acid), polyacrylic acid, poly(acrylamide-co-maleic acid), polyacrylonitrile, polyalkyl acrylates, polyalkyl methacrylates, polyvinyl methyl ether, polyvinyl ethyl ether, polyvinyl acetate, polyvinyl alcohol, poly-N-vinylpyrrolidone, poly(N-vinylpyrrolidone-co-acrylic acid), polyvinyl methyl ketone, poly(4-vinylphenol), poly(acrylic acid-co-styrene), oxazoline polymers, polyalkylene imines, maleic acid and maleic anhydride copolymers, hydroxyethyl cellulose, polya-

cetates, ionic surface-active and interface-active compounds, bile acids and their salts, esters and amides, carboxylic esters of polyhydric alcohols and glycosides;

a, b, d, g and n are integers or fractions greater than zero, c, f, e, h and k are integers or fractions greater than or equal to zero, with at least one number being different from zero; with the proviso that a, b, c, and d, and also g and n are chosen so that the compound is electrically neutral.

5. The method of claim 4, wherein M^1 is Zn^{2+}; M^2 is Co^{3+}; A is cyanide; and X is acetate.

6. The method of claim 4 or 5, wherein the DMC catalyst is a crystalline catalyst.

7. The method of claim 6, wherein the crystal structure of the DMC catalyst is monoclinic.

8. The method of claims 6 or 7, wherein the DMC catalyst exhibits a platelet-like morphology.

9. The method of any one of claims 1 to 8, wherein the dispersing medium is water.

10. The method of any one of claims 1 to 9, wherein the gas atmosphere comprises nitrogen.

11. The method of any one of claims 1 to 10, wherein the gas atmosphere comprises water.

12. The method of any one of claims 1 to 11, wherein the concentration of the DMC catalyst in the dispersing medium is 0.05 to 90 % by weight.

13. The method of any of claims 1 to 12, further comprising, prior to conditioning the DMC catalyst, preparing the DMC catalyst by a process comprising reacting an aqueous solution of hexacyanocobaltic acid with an aqueous solution of zinc acetate dihydrate.

14. The method of claim 13, wherein the DMC catalyst is not isolated between preparing and conditioning the DMC catalyst.

15. The method of claim 14, wherein preparation and conditioning of the DMC catalyst is carried out in one and the same vessel.

16. The method of claim 13, further comprising isolating the DMC catalyst between preparing and conditioning the DMC catalyst.

17. The method of any one of claims 1 to 12, further comprising, prior to conditioning the DMC catalyst, preparing the DMC catalyst by a process comprising reacting an aqueous solution of a cobalt salt with an aqueous solution of a zinc salt and an aqueous solution of an alkali cyanide.

18. The method of claim 17, wherein the DMC catalyst is not isolated between preparing and conditioning the DMC catalyst.

19. The method of claim 18, wherein preparation and conditioning of the DMC catalyst is carried out in one and the same vessel.

20. The method of claim 17, further comprising isolating the DMC catalyst between preparing and conditioning the DMC catalyst.

21. A DMC catalyst obtainable by the process of any one of claims 1 to 20.

22. The DMC catalyst of claim 21, showing in its XRD diagram reflections corresponding to d-values of 9.00±0.04 Å, 6.52±0.04 Å, 5.41±0.04 Å, 4.51±0.04 Å.

23. The DMC catalyst of claim 22, additionally showing in its XRD diagram reflections corresponding to d-values of 5.20±0.04 Å, 4.80±0.04 Å, 3.75±0.04 Å, 3.60±0.04 Å, 3.46±0.04 Å, 2.82±0.04 Å, 2.77±0.04 Å, 2.61±0.04 Å, 2.40±0.04 Å.

24. The DMC catalyst of claim 8, comprising zinc and cobalt and having an orthorhombic crystal structure.

25. The DMC catalyst of any one of claims 20 to 24, having a zinc content of 20 to 35 wt.-%

26. The DMC catalyst of claim 24 or 25, having a molar ratio zinc/cobalt of from 1.7 to 2.3.

27. Use of a DMC catalyst according to any one of claims 21 to 26 in the polymerisation of epoxides or the copoly-

merisation of epoxides with lactones, anhydrides, or carbon dioxide.

28. Use of a DMC catalyst according to any one of claims 21 to 26 in the production of polyether polyols.

claims:

1. A method for conditioning a DMC catalyst, comprising heating a suspension of the DMC catalyst in a dispersing medium under a gas atmosphere, the gas being selected from the group consisting of nitrogen, carbon monoxide, carbon dioxide, water, and noble gases, at a temperature in the range of from 140 to 270°C, and a pressure of 1 to 300 bar, for a period of time in the range of from 1 min to 24 hrs.

2. The method of claim 1, wherein the suspension is stirred at 0 to 3,000 rpm.

3. The method of claim 1 or 2, wherein the suspension is stirred using a stirring power of 0 to 5 W/l

4. The method of any one of claims 1 to 3, wherein the DMC catalyst has the formula:

$$M^1_a[M^2(CN)_b(A)_c]_d \odot f M^1_g X_n \odot h(H_2O) \odot eL \odot kP$$

wherein

M^1 is a metal ion selected from the group consisting of Zn^{2+}, Fe^{2+}, Co^{3+}, Ni^{2+}, Mn^{2+}, Co^{2+}, Sn^{2+}, Pb^{2+}, Mo^{4+}, Mo^{6+}, Al^{3+}, V^{4+}, V^{5+}, Sr^{2+}, W^{4+}, W^{6+}, Cr^{2+}, Cr^{3+}, Cd^{2+}, La^{3+}, Ce^{3+}, Ce^{4+}, Eu^{3+}, Mg^{2+}, Ti^{3+}, Ti^{4+}, Ag^{+}, Rh^{1+}, Ru^{2+}, Ru^{3+}, Pd^{2+};

M^2 is a metal ion selected from the group consisting of Fe^{2+}, Fe^{3+}, Co^{2+}, Co^{3+}, Mn^{2+}, Mn^{3+}, V^{4+}, V^{5+}, Cr^{2+}, Cr^{3+}, Rh^{3+}, Ru^{2+}, Ir^{3+},

and M^1 and M^2 are different;

A is an anion selected from the group consisting of halide, hydroxide, sulfate, carbonate, cyanide, thiocyanate, isocyanate, cyanate, carboxylate,

oxalate and nitrate;

X is an anion selected from the group consisting of halide, hydroxide, su lfate, carbonate, cyanide, thiocy-anate, isocyanate, cyanate, carboxylate , oxalate and nitrate;

L is a water-miscible ligand selected from the group consisting of alcoho ls, aldehydes, ketones, ethers, polyethers, esters, polyesters, polycarbo nate, ureas, amides, nitriles and sulfides and mixtures thereof;

P is an organic additive selected from the group con-sisting of polyether s, polyesters, polycarbonates, polyalkylene glycol sorbitan esters, polya lkylene glycol glycidyl ethers, polyacrylamide, poly (acrylamide-co-acryl ic acid), polyacrylic acid, poly (acrylamide-co-maleic acid), poly-acrylo nitrile, polyalkyl acrylates, polyalkyl methacry-lates, polyvinyl methyl ether, polyvinyl ethyl ether, polyvinyl acetate, polyvinyl alcohol, poly-N-vinylpyrrolidone , poly (N-vinylpyrrolidone-co-acrylic acid), polyvinyl methyl ketone, poly (-vinylphenol) , poly (acrylic acid-co-styrene) , oxazoline polymers, polyalkylene imines, maleic acid and maleic anhydride copolymers, hydroxyethyl cellulose, polya-cetates, ionic surface-active and interface-active compounds, bile acids and their salts, esters and am ides, car-boxylic esters of polyhydric alcohols and glycosides;

a, b, d, g and n are integers or fractions greater than zero, c, f, e, h and k are integers or fractions greater than or equal to zero, with at le ast one number be-ing different from zero; with the proviso that a, b, c, and d, and also g and n are chosen so that the compound is electrically neutral.

5. The method of claim 4, wherein M^1 is Zn^{2+}; M^2 is Co^{3+}; A is cyanide; and X is acetate.

6. The method of claim 4 or 5, wherein the DMC catalyst is a crystalline catalyst.

7. The method of claim 6, wherein the DMC catalyst crystallizes in a mono clinic crystal system.

8. The method of claims 6 or 7, wherein the DMC catalyst exhibits a plate let-like morphology.

9. The method of any of claims 1 to 8, wherein the dispersing medium is w ater.

10. The method of any of claims 1 to 9, wherein the gas atmosphere compri ses nitrogen.

11. The method of any of claims 1 to 10, wherein the gas atmosphere compr ises water.

12. The method of any of claims 1 to 11, wherein the concentration of the DMC catalyst in the dispersing medium is 0.05 to 90 % by weight.

13. The method of any of claims 1 to 12, further comprising, prior to con ditioning the DMC catalyst, preparing the DMC catalyst by a process compr ising reacting an aqueous solution of hexacyanocobaltic acid with an aque ous solution of zinc acetate dihydrate.

14. The method of claim 13, wherein the DMC catalyst is not isolated betw een preparing and conditioning the DMC catalyst.

15. The method of claim 14, wherein preparation and conditioning of the D MC catalyst is carried out in one and the same vessel.

16. The method of claim 13, further comprising isolating the DMC catalyst between preparing and conditioning the DMC catalyst.

17. The method of any of claims 1 to 12, further comprising, prior to con ditioning the DMC catalyst, preparing the DMC catalyst by a process compr ising reacting an aqueous solution of a cobalt salt with an aqueous solut ion of a zinc salt and an aqueous solution of an alkali cyanide.

18. The method of claim 17, wherein the DMC catalyst is not isolated betw een preparing and conditioning the DMC catalyst.

19. The method of claim 18, wherein preparation and condi-tioning of the DMC catalyst is carried out in one and the same vessel.

20. The method of claim 17, further comprising isolating the DMC catalyst between preparing and conditioning the DMC catalyst.

21. A DMC catalyst obtainable by the process of any one of claims 1 to 20 .

22. A DMC catalyst showing in its XRD diagram reflections corresponding t o d-values of 9.00±0.04Å, 6.52±0.04Å, 5.41±0.04Å, 4.51±0.04Å.

23. The DMC catalyst of claim 22, additionally showing in its XRD diagram reflections corresponding to d-values of 5.20+0.04Å, 4.80±0.04Å, 3.751 0.04Å, 3.60+0.04Å, 3.46±0.04Å, 2.82±0.04Å, 2.77±0.04Å, 2.6110.04Å, 2.40+0.04Å.

Å

24. A DMC catalyst comprising zinc and cobalt and crystallizing in the or thorhombic crystal system.

25. The DMC catalyst of any one of claims 20 to 24, having a zinc content of 20 to 35 wt.-%

26. The DMC catalyst of claim 24 or 25, having a molar ratio zinc/cobalt of from 1.7 to 2.3.

27. Use of a DMC catalyst according to any one of claims 21 to 26 in the polymerisation of epoxides or the copolymerisation of epoxides with lacto nes, anhydrides, or carbon dioxide.

28. Use of a DMC catalyst according to any one of claims 21 to 26 in the production of polyether polyols.