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(54) **Title**: COMPOSITION

(57) **Abstract**: A composition comprises a catalyst admixed with an insoluble support matrix. The catalyst is impregnated into the support matrix by swelling the support matrix using a solvent.

COMPOSITION

The present invention relates to a composition comprising a bleaching catalyst admixed with a support matrix.

Inorganic peroxygen compounds, especially hydrogen peroxide and solid peroxygen compounds which dissolve in water to release hydrogen peroxide, such as sodium perborate and sodium carbonate perhydrate, have long been used as oxidizing agents for purposes of disinfection and bleaching. The oxidizing action of these substances in dilute solutions is heavily dependent on the temperature; for instance, with H_2O_2 or perborate in alkaline bleaching liquors, sufficiently rapid bleaching of soiled textiles is obtained only at temperatures above about 80°C. At lower temperatures the oxidizing action of the inorganic peroxygen compounds can be enhanced by adding what are called bleach activators, for which numerous proposals have been disclosed in the literature, principally from the classes of the N-acyl or O-acyl compounds, examples being polyacylated alkylenediamines, especially tetraacetylethylenediamine, acylated glycolurils, especially tetraacetylglycoluril, N-acylated hydantoins, hydrazides, triazoles, hydrotriazines, urazoles, diketopiperazines, sulfurylamides and cyanurates, and also carboxylic anhydrides, especially phthalic anhydride, carboxylic esters, especially sodium nonanoyloxybenzenesulfonate, sodium isononanoyloxybenzenesulfonate and acylated sugar derivatives, such as pentaacetylglucose. By addition of these substances the bleaching action of aqueous peroxide liquors can be increased to such an extent that even at temperatures around 60°C essentially the same activities occur as with the peroxide liquor alone at 95°C.

Given the concern for energy-saving laundering and bleaching methods, in recent years application temperatures well below

60°C have gained in importance, in particular below 45°C down to the cold water temperature, below 20°C.

Previously the use of transition metal salts and transition metal complexes has been described, for example in European patent applications EP 392 592, EP 443 651, EP 458 397, EP 544 490, EP 549 271 and WO 01/48138, referred to as bleaching catalysts.

It has now been observed that textiles, particularly coloured textiles, fade after a number of washes in the presence of a bleach catalyst. It is theorised that some catalysts previously used not only catalyze the activity of the peroxygen compound but also remain at least partly on their surfaces being bleached, and even when the cleaning operation has ended. These transition metal salts can then be oxidized and so cause colour damage, and, in extreme cases, the risk of oxidative damage to the textiles since they directly contact the textile. As an example a deposit of Mn (II), is readily oxidized to Mn (IV) dioxide, which is a very strong oxidizing agent, particularly toward easily oxidizable substances, such as organic dye compounds.

All of the bleaching catalysts known have the disadvantage that they are brought into intimate contact with the surfaces of the articles being treated and as such typically a portion of the catalyst adheres to those surfaces or even penetrate those surfaces. This gives rise to a risk of unwanted colour changes and in rare cases, there may even be holes / tears, as a result of fibre damage.

According to a first aspect of the invention there is provided a composition comprising a catalyst admixed with an insoluble support matrix, wherein the catalyst is impregnated into the support matrix by swelling the support matrix using a solvent.

Preferably the matrix is insoluble in aqueous media.

It has been found that the supported bleach catalyst of the present invention has a number of advantageous properties. The principle advantageous property is that the bleach catalyst, particularly the transition metal thereof when present (when used in a washing / bleaching operation) is not substantive upon an item being washed or bleached. Thus detrimental damage to the item is drastically reduced.

Another advantage of the present invention (when used in a washing / bleaching operation) is the catalysis of the oxidizing action and bleaching action of inorganic peroxygen compound at low temperatures. Effective catalysis is observed below 80°C and in particular from about 12°C to 40°C.

Another advantage of the present invention (when used in a washing / bleaching operation) is to allow for reduction of peroxygen amount and / or bleach activator (e.g. TAED) in a cleaning formulation while maintaining bleaching performance, thus allowing for cost reduction.

Being reusable and recoverable, a further advantage of the present invention is the repeated application of the novel solid oxidation bleaching catalyst. Such repeated applications can be useful in waste water treatment/water purification, for example in the textile industry and in pulp / cellulose bleaching operations.

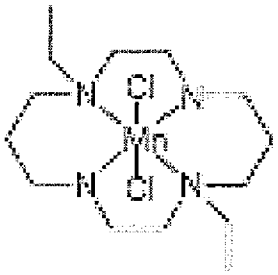
Preferably the bleach catalyst comprises a transition metal compound based upon one or more of manganese, copper, iron, silver, platinum, cobalt, nickel, titanium, zirconium, tungsten, molybdenum, ruthenium, cerium, lanthanum or vanadium. Most preferably the bleach catalyst comprises a transition metal compound based upon manganese.

The manganese bleach catalyst may be selected from wide range of manganese compounds. Suitable inorganic compounds (often salts) of manganese (e.g. Mn (II)) include hydrated / anhy-

drous halide (e.g. chloride / bromide), sulphate, sulphide, carbonate, nitrate, oxide. Further examples of suitable compounds (often salts) of manganese (e.g. Mn (II)) include hydrated / anhydrous acetate, lactate, acetyl acetonate, cyclohexanebutyrate, phthalocyanine, bis (ethylcyclopentadienyl), bis (pentamethylcyclopentadienyl).

Most preferably the bleach catalyst comprises manganese (II) acetate tetrahydrate and/or manganese (II) sulphate monohydrate.

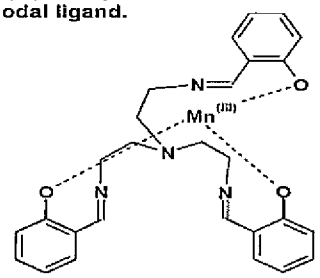
Alternatively the bleach catalyst may comprise:-



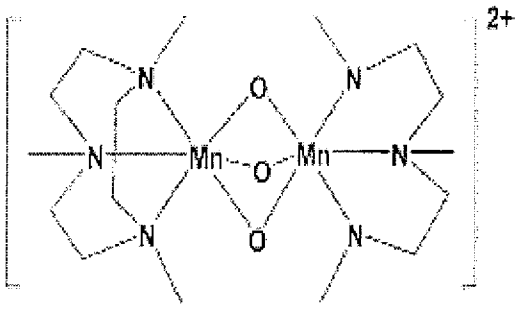
(1, 8 - diethyl-1, 4, 8, 11-TetraAzaCycloTetraDecane) manganese (II) chloride [Mn-TACTD].

Alternatively the bleach catalyst may comprise:-

Manganese (III) Catalyst with an organic tripodal ligand.



Alternatively the bleach catalyst may comprise:-



Generally the bleach catalyst comprises from 0.001% to 10.00%, preferably from 0.01% to 5.00% more preferably from 0.15% to 2.5% of the composition, with the remainder of the composition comprising the support matrix.

Generally the composition is for use in a washing operation, e.g. a textile washing operation in an automatic washing machine. The composition may be used for multiple washing operations; in this case the composition may comprise a shaped article.

Preferably the shaped article is an article which is commonly used in a washing operation but which has been modified to comprise the composition of invention. One particularly preferred such article is a "dosing ball", which are commonly used, particularly in laundry washing operations, for the dosing of the correct amount of detergent into the washing cycle.

Such dosing balls are by their nature reusable and thus the dosing ball is able to provide a bleach catalyst function over a plurality of wash cycles. The whole / a portion of the dosing may comprise the composition.

Another preferred article is a bucket / container which is used in combination with a bleach based formulation in a cleaning operation, e.g. for hard surface cleaning (floor cleaning or glass/window cleaning) or for a manual laundry operation. The bucket / container are preferably made by injection moulding of plastic (PP, PE, ABS, PMMA, polyamide, PVC, PU or any other plastic material).

A yet further article is a plastic table surface such as the kind used for manual laundry cleaning (in some developing countries).

Another article is a brush used in combination with a bleach based formulation in a cleaning operation, e.g. for rubbing clothes/laundry, dish / house ware or for toilet / ceramic cleaning.

Further articles include roll balls for pre-treating laundry, cleaning cloths, internal plastic components of automatic laundry washing machines and dishwashing machine/, reusable plastic food containers / cutlery.

Alternatively the shaped article may comprise a powder, a particle, a flake, a sheet or a fibre (e.g. a micro-fibre / nano-fibre) or a sponge.

The shaped article may be in the form of a foam.

These micro-structures may be agglomerated together into a macro-structure, e.g. the particles may be partially coalesced to make a honeycomb type structure or the fibres may be coalesced to make a woven / non-woven mat macro-structure.

Where the support is a particle, the preferred particle size is in the range of from 10nm to 10mm, more preferably from 0.1mm to 10mm, most preferably from 0.3mm to 0.5mm. The particles are preferably spherical.

Where the support is fibre, the preferred diameter in the range of from 30 nm to 2000μm, more preferably from 60nm to 1000μm.

The support matrix generally comprises a polymeric material. Suitable polymeric materials may be selected from the group of polyurethanes; polyolefins / hydrocarbons, e.g. polypropylene, polyethylene, polystyrene, polybutadiene; polyamides; polyvinyl chloride; polyesters, e.g. poly methyl methacrylate, poly vinyl acetate; phenolic resins; copolymers, e.g. polymethylmethacrylate with n-butylacrylate and styrene; natural / modified natural polymers, e.g. cellulose, rubber, latex, styrene-butadiene rubber, butyl rubber, chlorinated / hydrochlorinated rubber, nitrile rubber, vulcanized rubber, siliconised rubber; polycarbonates; silicone resins; fluorinated resins, e.g. PTFE.

The support matrix may comprise an inorganic material. Suitable inorganic materials include zeolite, silica, alumina, zirconia, phosphates (e.g. $AlPO_4$), ceramic, glass, bauxite, anatase (TiO_2) and carbon.

According to a second aspect of the invention there is provided a method of producing a composition comprising a bleaching catalyst admixed with an insoluble support matrix, wherein the catalyst is impregnated into the support matrix by swelling the support matrix using a solvent.

Suitable solvents include THF (Tetra Hydro Furan), THF mixed with water (e.g. in a 1:1 admixture), DMF (dimethyl formamide), ethanol, methanol and mixtures thereof. Most preferred solvents include THF and ethanol.

A suitable temperature for the swelling operation is from 20°C to and 65°C, with the most preferred temperature being about 20°C

A suitable time to allow the swelling to occur is from 12 hours to 3 days, with a most preferred timing being between 24 hours and 48 hours

Preferably the supported bleach catalyst is for incorporation in a detergent composition, e.g. a dishwashing, laundry, hard surface cleaning and / or disinfecting composition. Generally the composition is for use in the appropriate washing operation in a washing machine or other washing vessel such as a sink, bucket, etc. Alternatively the composition may be used in an additive (e.g. additives which are complementary to a detergent product used in a washing operation) or in addition to a product which contains a bleach.

The detergent composition may comprise a homogenous product, e.g. a uniform powder / liquid or alternatively the detergent composition may have a plurality of individual phases, e.g. such as a multi-phase tablet or a number of liquids contained in a multi-chamber container / bottle. Where a plurality of individual phases is present the supported bleach catalyst may be present in only a limited number of the phases, e.g. for a two phase tablet one phase may contain the supported bleach catalyst and one phase could be bleach catalyst free (and may contain a bleach, such as a source of peroxide / active oxygen).

The detergent composition typically comprises at least one of surfactant (anionic, non-ionic, cationic or amphoteric), builder, bleach, bleach activator, bleach stabilizer, bleaching catalyst, enzyme, polymer, co-builder, alkalizing agent, acidifying agent, anti-redeposition agent, silver protectant, colourant, optical brightener, UV stabilizer, fabric softener,

fragrance, soil repellent, anticrease substance, antibacterial substance, colour protectant, discolouration inhibitor, vitamin, phyllosilicate, odor-complexing substance, rinse aid, foam inhibitor, foaming agent, preservative, or auxiliary.

The invention is now illustrated by reference to the following non-limiting examples.

Examples

Example 1: Preparation of solid catalyst supported onto Poly Styrene (PS1)

In a 10 ml round bottom flask 41mg of poly styrene-co-divinylbenzene 2% cross-linked (microsphere 200-400 mesh) (CAS. 9003-70-7; Aldrich) and 50 mg of manganese II acetate tetra hydrate (Kemira) (MnAC) were suspended in 5 ml THF tetra hydro furan and mixed for 12 hours at room temperature to allow swelling of the polymeric fibres

The solvent was then evaporated at low/reduced pressure to allow microcapsules to form.

The solid catalyst formed/collected was washed three times with 50mL deionised water to remove the traces of free manganese acetate.

The manganese acetate loading factor was 2 mmol/g (millimoles of manganese acetate tetra hydrate per gram of PS).

At visual inspection, the solid catalyst PS1 produced is a dark beige fine powder.

Example 2: Oxidation Catalysis Study

Raw Materials

Deionised Water:	500 ml each Leg
Morin Hydrate (Sigma):	8.75 ppm
Sodium Percarbonate Coated granules:	1.38 g/l
TAED fine powder (100% active):	0.300 g/l
Manganese Acetate tetra hydrate (MnAc):	5 mg /L
Solid Catalyst:	variable

Equipment & Instrumentation

Spectrophotometer UV-Vis Cary 100 (supplied by Varian).

Procedure

The morin hydrate solution absorbance value was measured *via* spectrophotometer at 415 nm at time zero. Then, various bleaching systems were added as below:

Leg 1: PCB/TAED (reference without catalyst)
Leg 2: PCB/TAED + MnAc* (catalyses in homogenous phase)
Leg 3: PCB/TAED + PS1** (catalyses in heterogeneous phase)

* - 5mg/l
** - 15.6mg/l

The oxidation reaction of morin was conducted at constant temperature of 20°C; the absorbance value was taken after 30 minutes.

Results:

Results are expressed as percentage absorbance residue vs. the morin hydrate solution without any bleaching system:

	% Absorbance Residue @ 415 nm		
Time (minutes)	**LEG 1**	**LEG 2**	**LEG 3**
0	100	100	100
30	83	5.5	50

The above results show that the use of the heterogeneous catalyst PS1 (Leg 3) exhibits catalytic effect on the bleaching of morin in comparison to Leg 1 where no metal catalyst is added.

Example 3: Preparation of solid catalyst supported onto Poly Styrene (PS2)

In a 10 ml round bottom flask 204 mg of PS and 100 mg of MnAC were suspended in 5 ml THF/H_2O 1:1 v/v tetra hydro furan/water and mixed for 12 hours at room temperature to allow swelling of the polymeric fibres.

The solvent was then evaporated at low/reduced pressure to allow microcapsules to form.

The solid catalyst formed/collected was washed three times with 50 mL deionised water to remove the traces of free MnAC.

The MnAC loading factor was at 2 mmol/g (millimoles of MnAC per gram of resin). At visual inspection, the solid catalyst PS2 produced is a light beige fine powder.

Example 4: Oxidation Catalysis Study

The procedure of Example 2 was repeated but using the catalyst of Example 3.

Results:

	% Absorbance Residue @ 415 nm		
Time (minutes)	**LEG 1**	**LEG 2**	**LEG 3**
0	100	100	100
5′	96	17	96
15′	93	5.5	90
30′	83	5.5	73

The catalyst of Example 3 (PS2) is less active than the catalyst of Example 1 (PS1), at parity concentration.

An increased dose of the catalyst in Example 3 was tested at increased temperature (25°C).

LEG 3A = solid catalyst PS2 46.8 mg /l (3.36 ppm Mn)
LEG 3B = solid catalyst PS2 55.7 mg /l (4 ppm Mn)
LEG 3C = solid catalyst PS2 46.8 mg /l (3.36 ppm Mn)

The results are shown in the following table:

	% Absorbance Residue @ 415 nm		
Time (minutes)	**LEG 3A 20°C**	**LEG 3B 20°C**	**LEG 3C 25°C**
0	100	100	100
5′	90	90	90
15′	73	74	72
30′	55	54	46

By increasing the amount of PS2 the bleaching performance was improved. Also the increase in temperature from 20°C to 25°C improved the catalytic efficiency.

Example 5: Preparation of solid catalyst supported onto Poly Styrene (PS3)

In a 10 ml round bottom flask 204 mg of PS and 100 mg of MnAC were suspended in 5 ml THF/H_2O 1:1 v/v tetra hydro furan/water and treated for 12 hours in a reflux system at 65°C to allow swelling of the polymeric fibres.

The solvent was then evaporated at low/reduced pressure to allow microcapsules to form.

The solid catalyst formed/collected was washed three times with 50 mL deionised water to remove the traces of free MnAC.

The MnAC loading factor was at 2 mmol/g (millimoles of MnAc per gram of PS).

At visual inspection, the solid catalyst PS3 produced is a beige fine powder. The optical microscopy investigation showed perfectly spherical microcapsules with an average diameter of about 70 microns. The chemical analyses (*via* acid dissolution) gave 12161 ppm Mn present.

Example 6: Oxidation Catalysis Study

The procedure of Example 2 was repeated but using the catalyst of Example 5.

Results as follows:

	% Absorbance Residue @ 415 nm		
Time (minutes)	**LEG 1**	**LEG 2**	**LEG 3**
0	100	100	100
5′	96	17	93
15′	93	5.5	80
30′	83	5.5	61

Comparing the catalyst PS2 PS3, the best performing catalyst is the PS3.

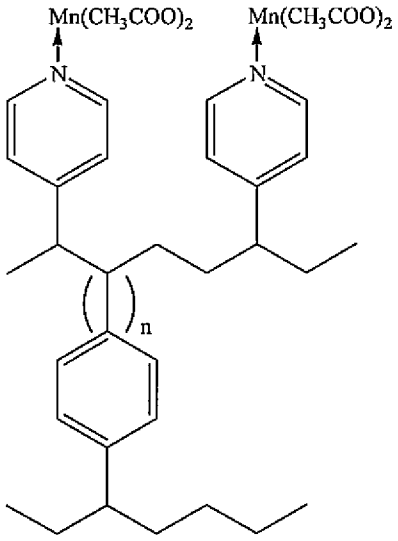
An increased concentration of PS3 was tested at 20°C

Experimental results were measured after 30 minutes, and are shown in the following table:

ppm PS3	15.6	41.4	55.2	139	195	250	276	345	0 / N
% Abs	61	35	26	21	17	12	7	6.5	5.5

These data shows that when adding 345 ppm of PS3 the same level of bleaching efficiency vs. homogenous catalyses is achieved.

Example 7: Preparation of solid catalyst supported onto Poly Vinyl Pyridine (PVP2)



PVP2 Poly Vinyl Pyridine supporting Manganese Acetate

In a 25 ml round bottom flask 408 mg of poly(4-vinylpyridine) 2% cross-linked with divinely benzene(CAS. 9017-40-7; supplied by Aldrich) (PVP) and 200 mg MnAc were suspended in 10 ml ethanol at room temperature and mixed for 12 hours.

The solvent was then evaporated under reduced pressure, to produce the solid catalyst PVP2

The solid catalyst formed/collected was washed three times with 50 mL deionised water to remove the traces of free manganese acetate.

The manganese acetate loading factor was at 2 mmol/g (millimoles of MnAC per gram of PVP).

The solid catalyst produces is of a granular format dark beige in colour, with irregular crystal shape.

The chemical analyses (*via* calcination), gave 11959 ppm Mn present.

Example 8: Oxidation Catalysis Study

The procedure of Example 2 was repeated but using the catalyst PVP2.

ppm PVP2	15.6	41.4	55.2	139	195	250	276	345	0/MnAC
% Abs	57	41	33	13	8	6	5.5	5.8	5.5

These data shows that when adding 14-18 ppm Mn in the form of catalyst PVP2, the same level of bleaching efficiency is achieved vs. using manganese acetate in homogeneous phase.

Example 9. Oxidation Catalysis Study

The catalytic efficiency of the catalyst PS3 and PVP2 was assessed *via* spectrophotometer using saffron (containing crocin, a carotenoid) as the substrate for the oxidation reaction.

Deionised Water:	500 ml per each Leg
Saffron (Bonetti):	35 ppm
Sodium Percarbonate Coated granules:	1.38 g/l
TAED fine powder:	0.300 g/l (100% active)
MnAC:	5 mg /L
Catalyst:	Variable concentration

Equipment & Instrumentation

Spectrophotometer UV-Vis Cary 100 (supplied by Varian).

Procedure

The saffron solution absorbance value was measured *via* spectrophotometer at 430 nm at time zero. Then, various bleaching systems were added as below:

Leg 1: PCB/TAED (reference without catalyst)
Leg 2: PCB/TAED + Mn (catalyses in homogenous phase)
Leg 3: PCB/TAED + Mn (catalyses in heterogeneous phase)

The oxidation reaction of saffron was conducted at constant 20°C, by measuring the absorbance value every 5 minutes for a total 30 minutes (or alternatively after 15 and 30 minutes).

Results:

Results are expressed as percentage absorbance residue vs. the saffron solution without any bleaching system:

	LEG 1	LEG 2	LEG 3 A	LEG 3B
Time (minutes)	PCB + TAED No catalyst	HOMOGENEOUS CATALYSIS PCB + TAED + MnAc	HETEROGENEOUS CATALYSIS PCB + TAED + (PS3) 18 ppm Mn	HETEROGENEOUS CATALYSIS PCB + TAED + (PVP2) 18 ppm Mn
0	100	100	100	100
15′	95	75	89	84
30′	73	53	67	64

Each value is the average of two measurements/two experimental runs. The catalyst PVP2 is confirmed to be the more efficient catalyst also on the bleaching of saffron.

CLAIMS

1. A composition comprising a catalyst admixed with an insoluble support matrix, wherein the catalyst is impregnated into the support matrix by swelling the support matrix using a solvent

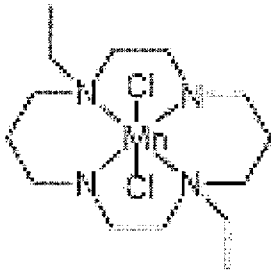
2. A composition comprising a bleaching catalyst admixed with an insoluble support matrix, wherein the catalyst is impregnated into the support matrix by swelling the support matrix using a solvent.

3. A composition according to claim 2, wherein the bleach catalyst comprises a transition metal compound based upon one or more of manganese, copper, iron, silver, platinum, cobalt, nickel, titanium, vanadium, cerium, lanthanum, zirconium, tungsten, molybdenum, ruthenium.

4. A composition according to claim 3, wherein the bleach catalyst comprises a transition metal compound based upon manganese.

5. A composition according to claim 4, wherein the bleach catalyst comprises a hydrated / anhydrous compound of manganese selected from the group comprising the halide (chloride/bromide), sulphate, sulphide, carbonate, nitrate, oxide, acetate, lactate, acetyl acetonate, cyclohexanebutyrate, phthalocyanine, gluconate, bis (ethylcyclopentadienyl), bis (pentamethylcyclopentadienyl), polyol, sorbitol, iditol, mannitol, xylithol, arabintol, lactose, dulsitol, adonitol, erythritol, inositol, cathecol.

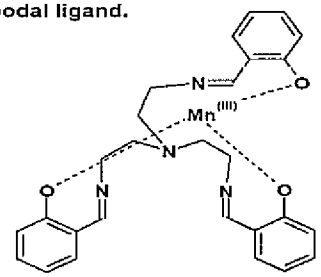
6. A composition according to claim 4, wherein the bleach catalyst comprises:-



(1, 8 - diethyl-1 , 4, 8, 11 - TetraAzaCycloTetraDecane) Manganese (II) chloride.

7. A composition according to claim 4, wherein the bleach catalyst comprises:-

Manganese (III) Catalyst with an organic tripodal ligand.



8. A composition according to claim 3, wherein the bleach catalyst comprises: manganese (II) acetate tetrahydrate and/or manganese (II) sulphate monohydrate.

9. A composition according to any one of the preceding claims, wherein the bleach catalyst comprises from 0.0001% to 20%, preferably from 0.001% to 10.00%, preferably from 0.01% to 5.00% more preferably from 0.15% to 2.5% of the composition.

10. A composition according to any one of the preceding claims where the matrix exhibits porosity.

11. A composition according to any one of the preceding claims, wherein the support matrix is a shaped article or gadget.

12. A composition according to claim 11, wherein the shaped article is a detergent dosing ball or a part of an automatic washing machine.

13. A composition according to claim 11, wherein the support is at least one of a powder, a particle, a flake, an agglomerate, a sponge, a sheet or a fibre (e.g. a micro-fibre or a nano-fibre).

14. A composition according to claim 13, wherein the support is a particle having a particle diameter in the range of from 10nm to 10mm.

15. A composition according to claim 13, wherein the support is a fibre having a diameter in the range of from 30 nm to 2000□m, more preferably from 60nm to 1000□m.

16. A composition in accordance with any one of preceding claims in which the support matrix comprises a polymeric material selected from the group of poly methyl methacrylate, polyurethanes; polyolefins / hydrocarbons, e.g. polypropylene, polyethylene, polystyrene, polybutadiene; polyamides; polyvinyl chloride; polyesters, poly vinyl acetate; phenolic resins; copolymers, e.g. polymethylmethacrylate with n-butylacrylate and styrene; natural / modified natural polymers, e.g. cellulose, rubber, latex, styrene-butadiene rubber, butyl rubber, chlorinated / hydrochlorinated rubber, nitrile rubber, vulcanized rubber, siliconised rubber; polycarbonates; silicone resins; fluorinated resins, e.g. PTFE.

17. A composition in accordance with any one of claims 1 to 15 in which the support matrix comprises one or more of zeolite silica, alumina, zirconia, phosphates (e.g. $AlPO_4$), ceramic, glass, bauxite, anatase (TiO_2), carbon.

18. A method of producing the bleach catalyst composition in accordance with any one of preceding claims in which the technique of solvent swelling impregnation is used.

19. A detergent composition comprising a bleach catalyst composition in accordance with any one of claims 1 to 17.

20. A detergent comprising the composition any one of claims 1 to 17 and at least one of surfactant (non-ionic, anionic, cationic or amphoteric), builder, bleach, bleach activator, bleach stabilizer, bleaching catalyst, enzyme, polymer, cobuilder, alkalizing agent, acidifying agent, antiredeposition agent, silver protectant, colourant, optical brightener, UV stabilizer, fabric softener, fragrance, soil repellent, anticrease substance, antibacterial substance, colour protectant, discolouration inhibitor, vitamin, phyllosilicate, odor-complexing substance, rinse aid, foam inhibitor, foaming agent, preservative, or auxiliary.

21. Use of a detergent composition according to claim 24 in a dishwashing, laundry and / or hard surface cleaning operation and/ or a sanitizer/disinfectant operation.

22. Use of a heterogeneous catalyst according to claim 1 for application in waste water treatment, in the textile industry, in hair care / hair bleaching formulations, in pulp and cellulose bleaching operations.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/057627

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D3/39
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/132456 A1 (RECKITT BENCKISER NV [NL]; RECKITT BENCKISER UK LTD [GB]; BALDAN SILVI) 6 November 2008 (2008-11-06) claims 1-26	1-22
X	EP 1 621 605 A1 (CIBA SC HOLDING AG [CH] CIBA HOLDING INC [CH]) 1 February 2006 (2006-02-01) paragraph [0023] - paragraph [0027]; claims 1-18	1-17, 19-22
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 September 2010	10/09/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Richards, Michael

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/057627

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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