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(54) Title: CORROSION PROTECTION IN LAUNDRY PROCESSES

(57) Abstract: The present invention prevents corrosion of metal parts of washing machines by using s-triazine derivatives.



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Corrosion protection in laundry processes

The present invention relates to the use of s-triazine derivatives as corrosion protective ingredients in aqueous liquors used in laundry processes.

In some detergent formulations sodium chloride is present as a filler substance, due to its availability in large amounts at low costs, or as a carrier material or part of the carrier materials for other detergent ingredients such as enzymes or perfumes. In some regions as a local washing habit consumers tend to use detergents with a chlorine bleach in textile washing processes, or to add sodium hypochlorite, normally in aqueous solution, to a washing liquor in order to enhance the bleaching and whitening effect on laundry. Such chlorine bleach, after having oxidized bleachable matter during the process, will in the end result in chloride ions.

In some regions water used for textile washing contains considerable amounts of NaCl (sea water or brackish water). So even if a detergent free from NaCl and no chlorine bleach is used, chloride anions are present during the wash process in this case.

Chloride ions tend to cause corrosion of metal parts of washing machines, at least after prolonged contact which might result from cumulated use of chlorine bleach or other sources of chloride anions. This corrosive effect might even be increased by the presence of oxidizing agents in the wash liquor.

Now it has surprisingly been found that the addition of certain s-triazine derivatives to aqueous chloride-containing laundry liquors inhibits corrosion on metal parts of washing machines.

A first aspect of the present invention is the use of an s-triazine derivative, selected from the group of cyanuric acid, its tautomer isocyanuric acid, dichloroisocyanuric acid, their alkali salts, and mixtures thereof, to inhibit corrosion of metal parts of washing machines that come into contact with aqueous wash liquors comprising chloride ions.

A second aspect of the invention is a process for washing textiles in an aqueous wash liquor, comprising steps of preparing an aqueous wash liquor that comprises chloride ions in a washing machine, adding an s-triazine derivative, selected from the group of cyanuric acid, its tautomer isocy-

anuric acid, dichloroisocyanuric acid, their alkali salts, and mixtures thereof, to said wash liquor, and contacting textiles in need of cleaning with the resulting wash liquor.

Parts of washing machines, that are composed of metal and come into contact with the aqueous wash liquor employed in the washing machine, such as heating devices and holders, are protected against corrosion by adding said s-triazine derivatives to the wash liquor. It is also possible to achieve this effect by using a detergent that comprises such a s-triazine derivative to prepare the aqueous wash liquor, by dissolving the detergent in water. The detergent preferably comprises from 0.0001 % by weight to 10 % by weight, in particular from 0.001 % by weight to 1 % by weight, of said s-triazine derivative.

Through the invention, it is possible to use chloride salts, usually alkali chlorides and among those especially sodium chloride, for example as a filler or carrier material, in detergents without having to fear that such detergents will cause damage to metal parts of washing machines when used in a laundry process employing such washing machines. Detergents which can be used to prepare the wash liquor and/or can be used in a process according to the invention preferably are solid, for example in the form of a powder, and/or may comprise up to 10 % by weight, especially of from 0.1 % by weight to 5 % by weight, of chloride (expressed as sodium chloride). In case not a fully formulated detergent is contemplated, but an additive to be used in the process to add defined ingredients, such as for example optical brighteners, enzymes, bleaches, or perfumes, the amount of chloride (expressed as sodium chloride), acting as a carrier for the ingredient, might even be higher, for example up to 95 % by weight or even up to 98 % by weight of the composition. The s-triazine derivative may be employed as part of such a detergent or additive composition, or as part of a composition that does not comprise chloride ions; especially the latter compositions may also be liquid at room temperature, and may for example be aqueous solutions of the s-triazine derivatives defined above. It is also possible to impregnate or to coat sheets, especially sheets made from textile materials, with the s-triazine or a detergent comprising the s-triazine and to add such a sheet to the wash liquor.

A further embodiment of the invention is a process for washing textiles in an aqueous wash liquor, comprising the steps of preparing an aqueous wash liquor in a washing machine by dissolving a detergent that comprises chloride ions and an s-triazine derivative, selected from the group of cyanuric acid, its tautomer isocyanuric acid, dichloroisocyanuric acid, their alkali salts, and mixtures thereof, to said wash liquor, and contacting textiles in need of cleaning with said wash liquor. The amount of s-triazine to be added to the wash liquor preferably is in the range of from 0.01 g/l to 1 g/l, in particular from 0.1 g/l to 0.2 g/l.

After contact times preferably in the range of from 1 min to 60 min, in particular from 8 min to 15 min, the textiles might be removed from the wash liquor, for example by taking them out of the

washing machine or draining the wash liquor out of the washing machine, rinsed with water, if one so wishes, and dried.

Examples

Example 1: Powder detergents (% weight):

	E1	E2
C ₁₂₋₁₄ -fatty alcohol with 7 EO	2	2
C ₁₂₋₁₄ -fatty alcohol sulfate with 7 EO, sodium salt	1.5	1.5
Linear alkylbenzene sulfonate, sodium salt	10	10
Sodium carbonate	25	25
Sodium hydrogen carbonate	6.5	6.5
Sodium disilicate	4	4
Sodium chloride	-	3
Polyacrylates, sodium salt	3	3
Sodium carboxymethylcellulose	1	1
Sodium phosphonate	1	1
Sodium sulfate	44	40
Enzymes	1	1
Sodium Dichloro Isocyanurate	1	2

Example 2: Liquid detergents (% by weight)

	E3	E4	E5
C ₁₂₋₁₄ -fatty alcohol with 7 EO	7	7	7
C ₁₂₋₁₈ -fatty acid, Na-salt	10	10	10
Boric acid	4	4	4
Citric acid	2	2	2
Propanediol	6	6	6
NaOH	3	3	3

Protease	0.6	0.6	0.6
Amylase	0.1	0.1	0.1
Sodium Isocyanurate	1	1,5	2,0
H ₂ O	Ad 100		

Example 3: Functional finisher (% by weight):

	E6
Sodium Chloride	95
Sodium Isocyanurate	2
Perfume	3

Example 4: Laundry Sheet impregnated with Sodium Isocyanurate (% by weight):

	E7
Textile Carrier	98
Sodium Isocyanurate	2

Claims

1. Use of an s-triazine derivative, selected from the group of cyanuric acid, its tautomer isocyanuric acid, dichloroisocyanuric acid, their alkali salts, and mixtures thereof, to inhibit corrosion of metal parts of washing machines that come into contact with aqueous wash liquors comprising chloride ions.
2. Use according to claim 1, characterized in that the wash liquor is prepared from a detergent that comprises up to 10 % by weight, especially of from 1 % by weight to 5 % by weight, of chloride.
3. Use according to claim 1 or 2, characterized in that the s-triazine derivative is part of a detergent that is used to prepare the aqueous wash liquor.
4. Use according to claim 3, characterized in that the detergent comprises from 0.0001 % by weight to 10 % by weight, in particular from 0.001 % by weight to 1 % by weight, of the s-triazine derivative.
5. Process for washing textiles in an aqueous wash liquor, comprising steps of preparing an aqueous wash liquor that comprises chloride ions in a washing machine, adding an s-triazine derivative, selected from the group of cyanuric acid, its tautomer isocyanuric acid, dichloroisocyanuric acid, their alkali salts, and mixtures thereof, to said wash liquor, and contacting textiles in need of cleaning with the resulting wash liquor.
6. Process according to claim 5, characterized in that after contact times in the range of from 1 min to 60 min, in particular from 8 min to 15 min, the textiles are removed from the wash liquor, rinsed with water, if one so wishes, and dried.
7. Process according to claim 5 or claim 6, characterized in that the s-triazine derivative is part of a detergent that is used to prepare the aqueous wash liquor.
8. Use according to any of claims 1 to 4, or process according to any of claims 5 to 7, characterized in that the amount of s-triazine added to the wash liquor is in the range of from 0.01 g/l to 1 g/l, in particular from 0.1 g/l to 0.2 g/l.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D3/00 C23F11/14 C11D3/28
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 C23F

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 352 785 A (CORLISS DUNCAN S ET AL) 14 November 1967 (1967-11-14) column 3, line 66 - line 73 -----	1-8
A	US 2012/094889 A1 (BORCHERS GEORG [DE] ET AL) 19 April 2012 (2012-04-19) paragraphs [0107], [0108] -----	1-8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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