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ALKYL PHOSPHATE ACTIVATORS FOR INORGANIC PEROXIDE BLEACHING

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The present invention relates to an improved process for the treatment of natural and synthetic textile fibers, either as such or in the form of yarns, woven and knitted fabrics or articles produced therefrom, with aqueous baths containing peroxidic compounds and more particularly with such baths containing a novel activating agent.

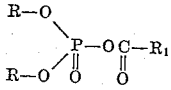
It is known that peroxidic compounds, such as hydrogen peroxide, sodium peroxide, sodium perborate, sodium percarbonate, sodium perphosphate and the like, can be used in washing and bleaching baths for textile fibers of all types. However, in some instances certain difficulties occur in their use as relatively high temperatures must be employed if the desired bleaching action is to be achieved. As a rule, temperatures almost up to boiling are used for such washing or bleaching. Such high temperatures for the washing and bleaching baths require considerable heat energy and furthermore are not suited for the ordinary washing machine.

For these reasons various so-called activators have been proposed which will permit the washing and bleaching operations to be carried out at lower temperatures while still achieving the desired whitening effect and good spot removal. Examples of such activators, for example, are: formamide, amides of unsaturated lower carboxylic acids, organic nitriles, anhydrides of di- and polybasic carboxylic acids, as well as anhydrides of unsaturated carboxylic acids.

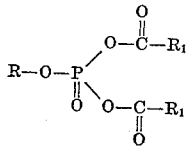
It is furthermore known that pyrophosphoric acid esters of fatty alcohols produce complex compounds with hydrogen peroxide which also can be used as components of bleaching and washing agents. Such complex compounds possess especially high stability and release the active oxygen at room temperatures much more slowly than, for example, sodium perborate. In addition, they also act as stabilizers for sodium peroxide, sodium perborate and other inorganic per salts.

According to the invention it was unexpectedly found that the reaction products of acylating agents, such as acetyl chloride with esters of phosphoric acid, are very excellent activators for per compounds.

Such acylated esters, for example, have the following formula:



and



wherein R, for example, can be the alkyl groups, such as ethyl, derived from the phosphoric acid ester and

is the acyl group, such as an acetyl group, derived from the acylating agent. The acylated esters are produced by known methods and exhibit a very good activating action, sufficient stability and a pleasant odor.

It was found that relatively small quantities of the activators according to the invention provide a good activation in aqueous peroxidic baths. For example, quantities between 0.1 to 1.0 mol per mol of active oxygen calculated as H_2O_2 are sufficient.

The bleaching and washing baths according to the invention which contain peroxidic textile bleaching agents and the activators according to the invention can in addition contain known stabilizers, buffering agents, wetting agents, detergents, protective agents for fibers and optical brighteners.

The best action according to the invention is obtained in neutral, weakly acidic and weakly alkaline baths or, in other words, at a pH between about 3 and 11. The temperature of the baths preferably is between 60 and 80° C. The active oxygen content of such baths preferably is between 0.05 g. and 20 g. per liter.

It is important for the action of the activators that they are dissolved directly together with the per compounds or shortly before or after such per compounds in order that coaction is ensured.

The following example will serve to illustrate the present invention.

Example

A rayon stable fiber woven fabric was boiled in red wine and its white content measured and found to be 31%. The measurement of such white content was with the Zeiss-Elrepho-whiteness degree measurer against white standard 565 and with filter 6.

This stained fabric was washed for 45 minutes at 60° C. in a quiescent bath of the following composition per liter:

	G.
Lauryl sulfate	1.250
Sodium pyrophosphate	0.625
Sodium tripolyphosphate	0.625
Dry water glass	0.350
Sodium perborate	0.600
Diethyl monoacetyl phosphate	0.980

The pH of such bath was 7.5 to 8. The treated fabric was rinsed and dried and then again its white content measured as above. After such treatment its white content was 69.4%.

The same stained fabric when treated under the same conditions, except for the omission of the diethyl monoacetyl phosphate, only had a white content of 48.0%.

We claim:

1. In a process for the treatment of fibers with an aqueous bath containing an inorganic peroxidic bleaching agent, the step which comprises incorporating a sufficient amount of an acetylated alkyl phosphate ester in such bath to activate said bleaching agent.

2. The process of claim 1 in which 0.1 to 1.0 mol of the acetylated alkyl phosphate ester are incorporated per mol of active peroxidic oxygen.

3. The process of claim 2 in which said acetylated alkyl phosphate ester is diethyl monoacetyl phosphate.

4. The process of claim 2 in which said acetylated alkyl phosphate ester is monoethyl diacetyl phosphate.

5. The process of claim 2 in which the temperature of the bath is between 60 and 80° C.

No references cited.