

18. Vortragstagung für Detergentien und Tenside

The apparatus and complementary analysis allow to study the influence of STPP characteristics on the process-progress and on the quality of finished powder, but also to determine the best conditions for the process (role of various surfactants, introduction order choice, break between the introductions of certain components).

Still the optimization of STPP is possible, and an example is given describing the performance obtained with such a product, particularly for the powder properties improvement (STPP recovery, storage behaviour, solubilisation ability).

In this way, it is possible to formulate low level STPP detergents keeping phosphate in the most active form (P3).

Zwitterionic amphiphiles: Synthesis and physical properties
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New neutral zwitterionic alkyl-betaines have been synthesized and their physical properties as dilute or concentrated solutions and as microemulsions were studied. The preparative synthesis procedure affords pure salt free compounds. Their solubilities in water are quite high, even with an octyl alkyl chain.

- Dilute solutions (micelles): As the zwitterion interchange methylene number n increases, the c.m.c. increases, reaches a maximum and decreases. Two opposite contributions influence the c.m.c.: the total hydrophobicity and the dipole moment of headgroups which depends strongly on the flexibility of the zwitterion.
- Concentrated solutions (mesophases): The structure of mesophases are maintained whatever the water content or the length of the chains, it only depends on the anionic part of the zwitterion.
- Microemulsions: Phase diagrams show WIII domains even with pure water and low pentanol contents. Salt and temperature have little effect.

Polarographic behaviour of some potential antineoplastic arylazopyrimidines in solubilised systems
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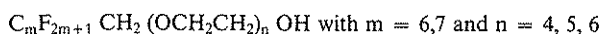
Although surfactants have been used in polarographic experiments, no systematic explanations have been given for the shift of the reversible half-wave potential, $E_{1/2}$, caused by their addition. This paper deals with this problem, focussing on the $E_{1/2}$ shift and the homogeneous electron-transfer kinetics of the substances solubilized in micelles which are known to be formed at surfactant concentrations beyond the critical micelle concentration c.m.c.

The polarographic reduction of arylazopyrimidines takes place in a single two-electron transfer, giving a diffusion-controlled wave in B.R. buffer at DME in solubilised systems corresponding to the reduction of azo group. Anionic surfactants (alkylarylsulphonates) do not affect the polarographic reduction whereas cationic (CTAB) and non-ionic (Tween-20) surfactants cause changes in the $E_{1/2}$ and another wave characteristics. Results have been explained on the basis of formation of phenylazo functionalised surfactants as an intermediate species.

Structure and solubilization properties of fluorinated nonionic surfactants

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Novel monodisperse fluoroalkylpolyoxyethylene surfactants with various numbers of oxyethylene units have been recently synthesized in the laboratory. Their general formula is:



They make possible the cosolubilization of water and fluorocarbons, and therefore allow to form very interesting gaz carrier systems.

Both the solubilization and structural properties of these fluorinated systems are similar to those of the parent hydrogenated compounds; in particular, the liquid crystals, swollen micelles and microemulsions formed by such surfactants are noticeably temperature dependent. Their behaviour shows that within one given phase domain in their phase diagram, all the systems generally have the same type of structure (viz, oil/water globules, or, incidentally, a bicontinuous dispersion). But within that domain, the sizes and shapes of the molecular structures/aggregates may be markedly composition dependent. The structural evolution of these molecular aggregates can be described by emphasizing the importance of the area per polar head of the surfactant, the oil/water penetration into the surfactant film, the aggregate polydispersity, and the attractive/repulsive interparticle potential. The structural determinators have been performed by using light, R. X., and small angle neutron scattering.

Influence of Surfactants in wool chlorination

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1 Introduction

Hercosett-chlorination process used to impart shrinkproofing properties to wool fabrics is achieved by pretreating the fibres with an hypochlorite solution at acid pH value. The peptides links existing in the proteic structure of the keratine are partially hydrolized during chlorination, whilst the disulfide bonds of cystine are submitted in a greater or lesser extent to an oxidation process. This degradative action affects to the quaternary structure of the protein and causes a damage of the mechanical properties of the fibres, becoming more difficult the ulterior textil process of the fabric.

There exists a large number of papers related with experimental changes in the conventional Hercosett-chlorination process. In general terms, there is a tendency to either substitute the chlorination of the fibres by other oxidative processes with a smaller degradative and a more homogeneous effect or even to avoid the oxidation pretreatment. However, the conventional process of chlorination and application of the cationic polymer is still in use in the textile industry, so that the authors believe that it would be of great value to know some experimental variables in the oxidation reaction in order to improve the final properties and characteristics of the fibres. The aim of the present work was to undertake a systematic study on the chemical reactivity of wool against hypochlorite solutions at different pH values and in the presence of anionic and cationic surfactants. For that purpose, the degradative effect caused on wool fibres by the different oxidative treatments, followed by the cysteic acid formation has been determined; on the other hand, the adsorption of the surfactants by the fibres was also estimated.

Finally, both parameters, degradative effect and surfactant uptake, have been correlated in order to optimize the effect of the surfactant present in the oxidative process of wool.

2 Results

The main results obtained throughout this investigation are expressed in the following figures and tables (Fig. 1, 2, 3; Table 1).

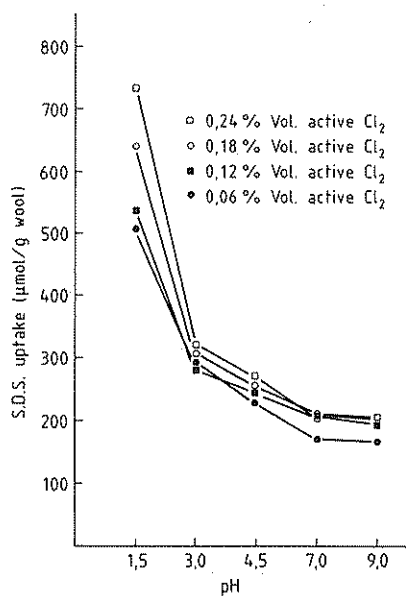


Fig. 1. Sodium Dodecyl sulphate (SDS) adsorption on wool in Sodium hypochlorite solutions at different pH values (C_i SDS = 25 mM)

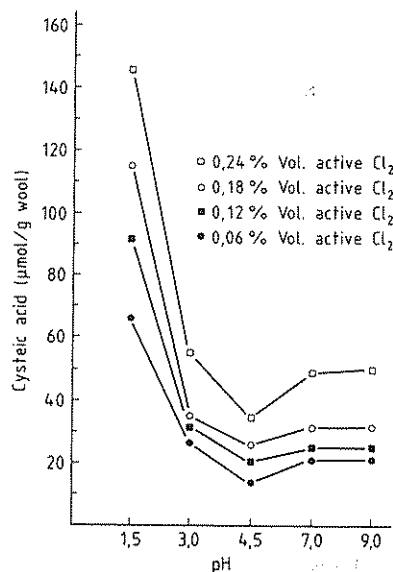


Fig. 2. Cysteic acid formation in chlorination of wool in the presence of sodium Dodecyl sulphate ($C_i = 25$ mM) at different pH values

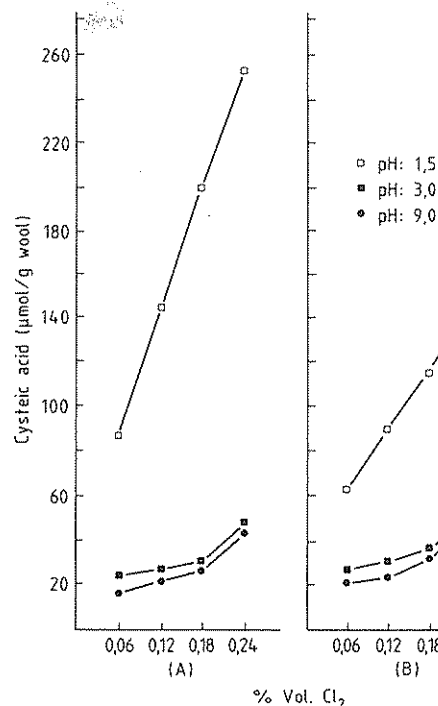


Fig. 3. Cysteic acid formation in the absence (a) and in the presence (b) of sodium Dodecyl sulphate ($C_i = 25$ mM), during wool chlorination

Table 1. Cysteic acid formation (μ moles/gr wool) in wool chlorination in the presence of sodium Dodecyl sulphate ($C_i = 25$ mM) or Hexadecyl-trimethyl-ammonium Bromide ($C_i = 25$ mM)

	pH = 7,0	pH = 9,0	pH = 10,5
no surfactant	22,0	22,1	21,6
S. D. S.	20,5	21,0	23,0
H. T. A. B.	18,2	19,0	19,1

3 Conclusions

- There is a maximum uptake of SDS on wool fibres at pH = 1.5, due to the high positive overall charge of the fibres.
- There is a maximum chlorination at pH = 1.5, due to the predominant Cl_2 species at low pH value.
- There exists an evident inhibitor effect of SDS on wool chlorination at pH = 1.5.
- At pH range of 4.5-10.5, the effect of SDS and HTAB on wool chlorination is practically null.

Sulfonation of LAB with SO_3 ; influence of free oil (unsulfonated matter) and its sulfone content on physical properties of linear alkylbenzene sulfonated (L. A. S.)

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It is frequently found among different detergent manufacturers that solubility (cloud point) and viscosity of sodium sulfonates of a given LAB can show great variations.

Obviously, this depends on the sulfonation process or more particularly on the free oil and its sulfone content.

Eight commercial sulfonic acids all of them derived from the same LAB have been studied in order to establish the relationship between sulfone content in free oil versus slurries viscosity. As can be seen in figure 4, the higher the sulfone content, the higher the viscosity is.

A more precise research was conducted by the laboratory in order to see the influence of parameters, such as SO_3 /LAB molar ratio and SO_3 /air ratio. Figure 5 shows the relationship between sulfone content and molar ratio SO_3 /LAB; the higher the sulfonation severity the higher the sulfones con-

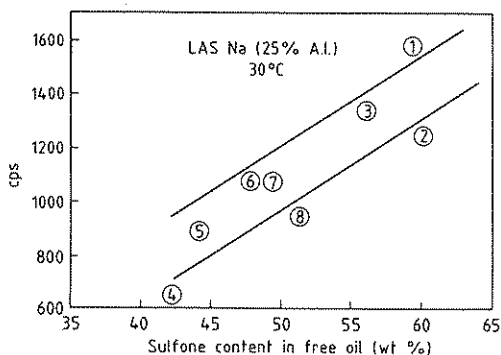


Fig. 4. Commercial Sulfonic Acids: Slurries Viscosity vs. Sulfon Content in Free Oil

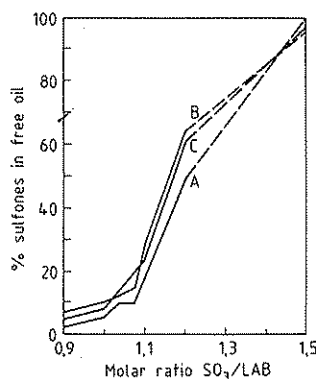


Fig. 5. LAB-Laboratory Sulfonation: Sulfones vs. Molar Ratio SO_3 /LAB; A-HF-Process, B- $AlCl_3$ -Process (30% 2-Phenyl)

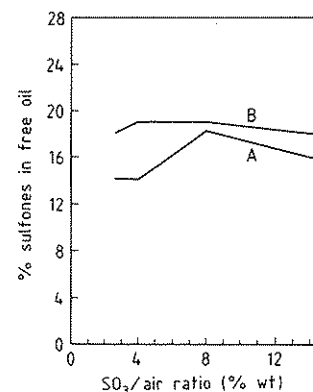


Fig. 6. LAB-Laboratory Sulfonation: Sulfones vs. SO_3 /Air-Ratio (SO_3 /LAB-Molar Ratio = 1,07); A-HF-Process, B- $AlCl_3$ -Process