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• Detergents

SULFATION OF STRAIGHT-CHAIN ALCOHOLS AND ETHOXYLATES WITH SULFUR TRIOXIDE. C. Sheely, Jr. and R. Rose (Continental Oil Co., Ponca City, Okla.). *Ind. Eng. Chem. Product Res. Dev.* 4, 24–28 (1965). The sulfation of straight-chain alcohols and ethoxylates with sulfur trioxide was investigated using a 1-gallon reactor designed and built for this work. Process conditions—such as temperature, sulfur trioxide-air conditions, degree of sulfation, and sparger mass velocities—were evaluated as to their effect on product quality. For example, ether sulfate color can be lowered by increasing the sparger mass velocity. By keeping the sulfation temperature about 5F above the freezing point of the material in the reactor, the unsulfated and salt content of alcohol sulfates could be reduced. Neutralization of the sulfated material is discussed.

DETERGENCY AND BIODEGRADABILITY OF ALCOHOL-BASED SECONDARY SULFATES. J. Livingston, Jr., R. Drogin and R. Kelly (Esso Res. and Engineering Co., Linden, N. J.). *Ind. Eng. Chem. Product Res. Dev.* 4, 28–32 (1965). Sodium alkyl sulfates were prepared by the sulfation of linear secondary alcohols. The sulfates were prepared from discrete carbon number alcohols and evaluated individually for foaming ability and cotton detergency. At the optimum molecular weight, the sulfates were equivalent to or better than tetrapropyl benzene sulfonate in foaming and cotton detergency. Individual sulfates were also evaluated for wetting power, biodegradability, and hydrolytic stability. The sulfates were as biodegradable and almost as hydrolytically stable as primary fatty sulfates.

STUDIES ON SODIUM ALKYLBENZENESULFONATES. II. WATER HARDNESS AND BUILDER EFFECTS ON THE MICELLAR SOLUBILIZATION AND DETERGENCY OF DODECYLBENZENESULFONATES. Yasushi Kimura, Syuhei Tanimori, and Terunosuke Shimo (Lion Fat & Oil Co., Tokyo). *Yukagaku* 13, 656–61 (1964). The solubilizing activity and detergency of some kinds of sodium dodecylbenzenesulfonate have been determined. In case of solubilizing of Orange-OT at 25C, linear type dodecylbenzenesulfonates are superior to tetramer types, except *n*-dodecylbenzenesulfonate which is restricted by its poor solubility. In hard water, the solubilizing activity of the sulfonates of both types shows a maximum at an appropriate hardness range, and then decreases in the solubilizing activity at higher hardness almost to zero. The addition of sodium sulfate increases their solubilizing activities and the substitution of a part of sulfate with sodium tripolyphosphate causes the maxima to be shifted to higher hardness ranges. In case of dodecyl-6-benzenesulfonate which clearly shows the shift phenomenon, the maxima was found at a calcium/tripolyphosphate equivalent ratio of 0.6–0.7, without any relation to the concentration of sulfate and phosphate. The detergency measured by soiled glass plate method at 25C is also enhanced at appropriate hardness ranges and the enhanced range of detergency moves toward higher hardness level by the addition of phosphate or the detergency is not decreased until higher hardness levels are reached.

III. HYGROSCOPICITY AND AGGLOMERATIVITY OF DODECYLBENZENESULFONATES. Yasushi Kimura, Syuhei Tanimori, Tohio Nagai, and Terunosuke Shimo. *Ibid.* 14, 19–23 (1965). Hygroscopicity and agglomerativity of sodium dodecylbenzenesulfonate-sodium sulfate system were determined at 35C, 48.5–92.0 and 80.0–90.0% relative humidity, respectively. The seven sulfonate containing the various structures given in the preceeding report were used, and the test materials were prepared by spray-drying with sodium sulfate. The hygroscopicity increases as the aromatic nucleus is located nearer the center of the alkyl chain. There is a correlation between hygroscopicity and agglomerativity of dodecylbenzenesulfonate-sodium sulfate systems.

• *Obituary*

Henry E. McLaughlin (1961) died March 2, 1965. He had been employed by the Newport Industries Co., and made his home in Pensacola, Fla.