Efficiency of Removal of Anionic and Nonionic Surfactants from Chemical Waste Water by Treatment Plant Using Adsorption on Activated Carbon and Aggregation Precipitation

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Water pollution by synthetic detergents has become a serious environmental problem. In 1984, the production of synthetic detergents reached 1000000 tons per year in Japan. Most synthetic detergents are discharged into public sewerages or public water systems. Anionic and nonionic surfactants are major components of synthetic detergents. In order to protect against water pollution, it is important to keep concentrations of these surfactants in environmental water as low as possible. Removal of surfactants from public sewage and industrial waste water can be performed by adsorption on activated carbon, aggregation precipitation or biochemical decomposition by activated sludge. Since few detailed investigations have been reported on the removal efficiency of anionic and nonionic surfactants by a treatment plant using adsorption on activated

carbon and aggregation precipitation, we investigated the effectiveness such a plant¹⁾ in the removal of anionic and nonionic surfactants from the waste water of chemical laboratories.

Waste water samples from individual chemical laboratories were taken 53 times both before and after the treatment from January in 1988 to December in 1988. The concentrations of anionic and nonionic surfactants in water samples were assayed by colorimetric methods using Co-PADAP and cobalthiocyanate reagents, respectively. The results showed that the surfactants were satisfactorily removed from the waste water by the treatment with a respective average removal efficiency of 67.4% and 31.7%. When the mechanism of removal of the surfactants was investigated as a laboratory scale by the same reactions as used in the treatment plant, it was confirmed that anionic surfactants were removed both by adsorption on activated carbon and aggregation method while nonionic surfactants were mainly removed by adsorption on activated carbon.

References

- 1) A. Adachi, M. Nakano and K. Kobayashi, *Eisei Kagaku*, **27**, 119 (1981)