Letters

Handling Carcinogens

Like David H. Fine (Letters, 26 Jan., p. 329), we find it incredible that some manufacturers of *N*-nitrosamines can be "apparently unaware or unconcerned about the toxic nature of such volatile carcinogens, which are so hazardous that they should be handled under conditions as stringent as those required for radioactive materials." We too have received nitrosamine samples in quantities of 10 and 25 grams packed in glass bottles with only a simple screw cap and carrying no warning whatsoever about the carcinogenic properties and the rather volatile character of the contents.

We have informed the manufacturers and their local representatives of our concern about the absence of adequate warning labels and of precautions with regard to shipment.

This unawareness or lack of caution is not a general phenomenon, since another important distributor of *N*-nitrosamines, Schuchardt GmbH, Munich, ships these samples in closed glass ampoules, which are "canned," together with a porous absorbent material, in a metal container. Both the glass and the metal container bear warning labels with detailed information about the carcinogenic properties of the compound inside. An instructive warning leaflet accompanies the shipment. These precautions seem adequate and should be taken as an example by other manufacturers.

We should like to direct the attention of fellow workers to a recommended code of practice for laboratory staff, drafted in 1966 by the Chester Beatty Research Institute of the Royal Cancer Hospital, London, entitled: "Precautions for laboratory workers who handle carcinogenic aromatic amines." This code of practice also covers the nitrosamines. We would also like to mention that the staff of the U.S. National Cancer Institute's Carcinogenesis Program is presently mailing reply forms on these and other problems to those engaged in nitrosamine research.

All technical staff working with nitrosamines should be carefully instructed. For most laboratories, problems in personnel management may arise, since the code of practice recommends that young persons should not be asked to use the carcinogenic substances. Schuchardt GmbH goes even further with regard to some of the nitrosamines and recommends that all females under the age of 40 and all youthful persons should be excluded from work with these compounds. We try to adhere to the recommendations as much as possible, taking into consideration the frequency of the manipulations and the concentrations of the materials. More stringent precautions should definitely be taken in work with pure chemicals than with extremely dilute solutions.

We hope that manufacturers of carcinogenic chemicals will fully realize their specific responsibility, which does not only pertain to synthesis and purification, but also to shipment, and especially to packaging and labeling.

P. J. GROENEN
Central Institute for Nutrition and Food Research TNO, Utrechtseweg 48, Zeist, Netherlands

Fuel Cells

Thomas Maugh's report on fuel cells (Research News, 22 Dec. 1972, p. 1273) presents an interesting review of the Pratt & Whitney Target program and its objectives. Unfortunately the claim that Pratt & Whitney aircraft is the only company actively pursuing a full-scale commercial fuel cell program is incorrect.

Exxon Enterprises, Inc., an affiliate of Exxon Corporation, and Alsthom, an affiliate of the French Compagnie Générale d'Electricité, are also engaged in a multimillion-dollar joint venture aimed at the development of commercial fuel cells. This Franco-American effort, under way since 1970 at Alsthom's laboratory near Paris and at Exxon's research facilities in New Jersey, is focused on practical generators using methanol. The virtues of methanol as a clean, easily handled, commercially viable fuel which can be manufactured from coal or foreign gas supplies has recently received attention in the technical press.

The fuel cell itself is based on the pioneering thin cell concept of Alsthom's Bernard Warszawski, who showed how to pack five to ten times as much active electrode surface into the same volume as found in conventional fuel cells (*1*).

The Alsthom-Exxon program thus also promises to bring the fuel cell out of space into the hands of industry and the public.

C. E. HEATH
Opération Pile à Combustible Alsthom-Exxon, Laboratoire de Recherche et de Développement Alsthom, 9 Rue Ampère, 91301-Massy, France

Reference

1. B. Warszawski, *Entropie* **14**, 33 (1967).

Thomas Maugh's discussion of fuel cells is restricted to their use as primary cells in which electricity is generated by electrochemical oxidation of fuels. However, the use of fuel cells or other cells as secondary batteries, that is, for storage of electric energy, was not discussed.

There is a great need for relatively cheap secondary batteries of high specific energy (watt hours per kilogram) in terms of conservation and better utilization of energy, as well as of reduction of air pollution. These aspects have been well recognized, for instance, in connection with electric cars (*1*). Also, the need for large energy capacity batteries in electric power substations and in other dispersed locations (in 10 to 20 megawatt blocks) has been recently emphasized (*2*). Even from these two examples, it is evident that research and development aimed at increasing the specific energy, decreasing the cost, and increasing the reliability and lifetime of secondary batteries is socially very relevant. Also, it is important to realize that the specific energies of present batteries are 5 to 10 times less than the theoretical values (*3*). Even when allowance is made for the weight of the electrolyte, cell housing, and so forth, there is still a large margin for increasing the specific energy.

The combination of great social need and inherent possibility for significant