

Labelling of Alkyl Iodides with ^{131}I by Heterogeneous Isotopic Exchange

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SEVERAL investigators have studied the heterogeneous exchange of alkylhalides with halogens in solid-gas systems.^(1,2) Here a method is reported where the isotopic exchange takes place between iodine, adsorbed on rhodium, and alkyl iodides in solid-liquid systems.^(3,4) Rhodium black (surface area approx. $15\text{ m}^2\text{g}^{-1}$), free of oxide, was mixed with an aqueous solution of radioiodine (^{131}I) slightly acidified with sulphuric acid. After adsorption equilibrium had been attained (a few hours in an unstirred solution), the adsorbent was washed with redistilled water, dried at room temperature and placed in a glass ampoule containing the organic iodide to be labelled. The ampoule was sealed and kept at a temperature near the boiling point. The labelling yields obtained in case of 30 min contact time are listed in Table 1.

The chemical purity of the labelled products was checked by radio gas chromatography. Figure 1 shows the gas chromatogram of the inactive ethyl iodide and the radio gas chromatogram of the labelled product both obtained by using a Packard

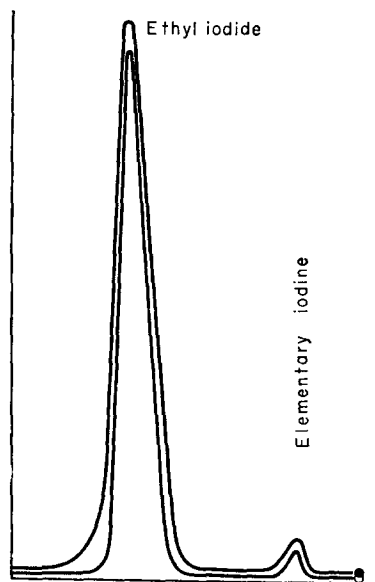


FIG. 1. Gas chromatogram of the inactive (○) and radio gas chromatogram of the labelled ethyl iodide (●).

7409 type gas chromatograph with a heat conductivity cell and an ionization chamber as detectors, respectively. The similarity of the two graphs indicates that a simple exchange reaction took place with the ethyl iodide, and that the free iodine content was not increased by the labelling procedure. This means that when using an organic iodide of high purity, i.e. free of elementary iodine, no purification of the labelled product is necessary.

TABLE 1

Alkyl iodide	Boiling point (°C)	Labelling temperature (°C)	Labelling yield* (%)
Methyl iodide	42.5	38	20
Ethyl iodide	71	90	36
<i>n</i> -Propyl iodide	102	120	63
<i>n</i> -Butyl iodide	131	120	78

* It should be noted that the rate of exchange and thus the labelling yield as well depend on the structure and/or specific surface area of the rhodium adsorbent. The data listed refer to the same batch of adsorbent.

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References

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