

## A Direct Preparation of Fully Deuterated High-molecular-weight Hydrocarbons

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THERE is growing interest in methods of synthesizing isotopically labelled compounds in view of their widespread use in the study of reaction mechanisms both of a chemical and biological nature.

We report a general exchange procedure for the preparation of saturated fully deuterated hydrocarbons containing from 10 to 36 carbon atoms which complements several other recent syntheses of deuterated hydrocarbons.<sup>1-4</sup> Thus, Garnett and his co-workers have reported the use of DCl to label olefins<sup>1</sup> and Larson, Hightower, and Hall<sup>2</sup> have prepared a number of low-molecular-weight perdeuterated olefins using D<sub>2</sub> gas and an alumina

catalyst. Workers from this laboratory have also reported the use of the Wittig reaction to synthesize a number of specifically labelled olefins,<sup>3</sup> and Dixon and Marr<sup>4</sup> have reported the gas-phase exchange of octanes with D<sub>2</sub> gas.

The latter technique, which has been used in several laboratories, is not applicable to the higher-molecular-weight nonvolatile hydrocarbons, and we have accordingly investigated and successfully developed a liquid-phase exchange procedure. The method consists of bubbling D<sub>2</sub> gas through an exchange cell containing the hydrocarbon and a fixed bed of catalyst. Catalysts successfully investigated to date are Pd, Pt, and Rh (each 2%

