NEW PATHWAY FOR THE PREPARATION OF PERFLUOROPERHYDROACENAPHTHENE

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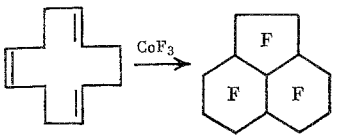
Perfluoroperhydroacenaphthene has been obtained in 45% yield by the fluorination of acenaphthene using cobalt fluoride at 400°C [1]. This compound has been proposed for use as an oxygen-transferring blood substitute [2].

We have found that the fluorination of cis,trans,trans-1,5,9-cyclododecatriene (I) using CoF_3 gives perfluoroperhydroacenaphthene (II). The reaction was performed by passing 180 g (I) over 5 kg CoF_3 for 1.5-2 h at 330-350°C. The liquid obtained (450 g) was shown by gas–liquid chromatography to contain 50% perfluoroperhydroacenaphthene (II) which was isolated by distillation, bp 175-176°C. The IR and ^{19}F NMR spectra of (II) were similar to the spectra of authentic perfluoroperhydroacenaphthene obtained by the fluorination of acenaphthene [1].



(I) (II)

This reaction pathway may be explained by the conversion of (I) or its fluorinated derivatives formed by the action of CoF_3 into acenaphthene, hydroacenaphthenes, or their fluoro derivatives with subsequent exhaustive fluorination. Skeletal transformation of (I) may apparently occur with the participation of HF liberated during the fluorination process.

In the presence of polyphosphoric acid, (I) undergoes skeletal isomerization to give octahydroacenaphthene which then disproportionates to give acenaphthene and decahydroacenaphthene [3].

LITERATURE CITED

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