

Bis(trifluoromethyl)sulphimide

By STANLEY D. MORSE and JEAN'NE M. SHREEVE*

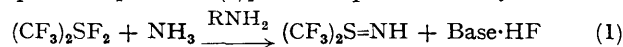
(Department of Chemistry, University of Idaho, Moscow, Idaho 83843)

Summary The synthesis of the stable bis(trifluoromethyl)sulphimide, $(\text{CF}_3)_2\text{S}=\text{NH}$, and its lithium salt are reported; the latter is a useful intermediate for preparation of new stable substituted sulphimides.

ALTHOUGH the substituted difluorosulphimides, $\text{F}_2\text{S}=\text{NX}$ ($\text{X} = \text{F}, \text{Cl}, \text{Br}, \text{I}$), have been synthesized and thoroughly studied,¹ the formal parent sulphimide, $\text{F}_2\text{S}=\text{NH}$, has not been prepared. Dimethylsulphimide,² $\text{Me}_2\text{S}=\text{NH}$, is stable at -30°C , but slowly decomposes at 0°C . We now report the synthesis of bis(trifluoromethyl)sulphimide, $(\text{CF}_3)_2\text{S}=\text{NH}$,

which, in contrast to its fluoro and methyl analogues, is a colourless liquid stable in Pyrex glass at 25°C and above for extended periods. This is yet another example of the stabilizing effect of replacing F or CH_3 with CF_3 .

Bis(trifluoromethyl)sulphur difluoride, $(\text{CF}_3)_2\text{SF}_2$, unlike SF_4 ³ and CF_3SF_3 ,⁴ is inert towards water and ammonia.⁵ However, in the presence of a primary amine, reaction with excess of ammonia does proceed smoothly to give the sulphimide [reaction (1)]. After purification by fractional

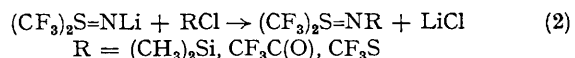


condensation, a yield of 55% is obtained when benzylamine is the primary amine used. Lower yields result with alkyl amines.

The mass spectrum shows the molecular ion at m/e 185, the ^{19}F and ^1H n.m.r. spectra are composed of singlets at ϕ 68.4 p.p.m. and at δ 2.45, respectively, and the i.r. spectrum has absorbance bands at 3311, 1225, 1178, 1091, 954, 743, 599, 520, and 447 cm^{-1} .

The reaction of $(\text{CF}_3)_2\text{S}=\text{NH}$ with n-butyl-lithium gives a nearly white, crystalline solid, $(\text{CF}_3)_2\text{S}=\text{NLi}$, which has proved to be a useful precursor to a variety of stable

compounds. This sulphimide and its derivatives will



provide an opportunity to compare the reactivities and general properties of the $(\text{CF}_3)_2\text{S}=\text{N}-$ system with that of $(\text{CF}_3)_2\text{C}=\text{N}-$ in the analogous imines.⁶

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