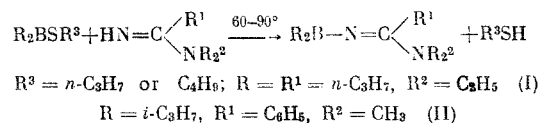


B. M. Mikhailov, V. A. Dorokhov,
V. I. Seredenko, and I. P. Yakovlev

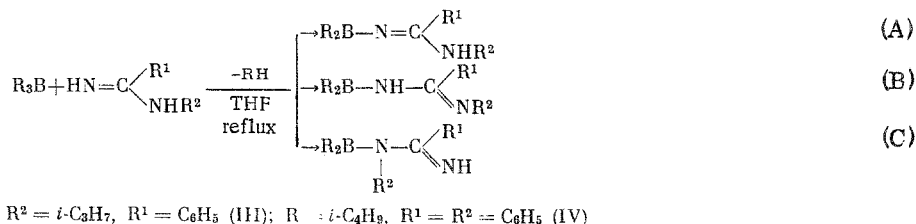
UDC 592.91:547.1'127

The reaction of unsymmetrical N,N-dialkylamidines with the esters of dialkylthioboric acids gives dialkylborylamidines (DBA), in which the boron is attached to the imino nitrogen of the amidine.



The following compounds were synthesized with this procedure: N,N-diethyl-N'-di-n-propylborylbutyramidine (I), 70% yield, bp 95-97° (3 mm), and N,N-dimethyl-N-diisopropylborylbenzamidine (II), 90% yield, bp 110-112° (2.5 mm). Compounds (I)-(II) are monomeric (by cryoscopy in benzene, ^{11}B NMR), and their IR spectra contain an intense band at 1800 cm^{-1} , which is characteristic for monomeric compounds that contain the $>B-N=C<$ group [1].

The DBA can be obtained from the N-unsubstituted, monosubstituted and symmetrically disubstituted amidines by refluxing a mixture of the trialkylborane with the amidine in either THF or benzene (see [2] for the reaction of tri-n-propylborane with N,N'-diphenylacetamidine). Compound (III), with bp 119-121° (2.5 mm), which was obtained in 87% yield from triisopropylborane and N-isopropylbenzamidine, and compound (IV), with bp 151-154° (1 mm), which was synthesized in 80% yield from triisobutylborane and N-phenylbenzamidine, were isolated in the monomeric form. It is possible for (III) and (IV) to exist as the tautomers (A), (B), and (C).



The presence in the IR spectrum of (III) of an intense band at 1800 cm^{-1} ($>B-N=C<$) and a relatively weak band at 1650 cm^{-1} ($N-C=N-$) testifies to the predominance of tautomer (A). In contrast, in the spectrum of (IV) the 1635 cm^{-1} band is much more intense than the 1805 cm^{-1} band, and consequently the amount of tautomer (A) in the mixture is smaller than that of (B) or (C).

The purity of DBA (I)-(IV) was confirmed by the elemental analysis and NMR spectral data.

LITERATURE CITED

1. B. M. Mikhailov, V. A. Dorokhov, and I. P. Yakovlev, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 332 (1966).
2. B. M. Mikhailov and V. A. Dorokhov, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 2649 (1973).

N. D. Zelinskii Institute of Organic Chemistry, Academy of Sciences of the USSR, Moscow. Translated from *Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya*, No. 7, pp. 1665-1666, July, 1974. Original article submitted March 27, 1974.

© 1975 Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission of the publisher. A copy of this article is available from the publisher for \$15.00.