

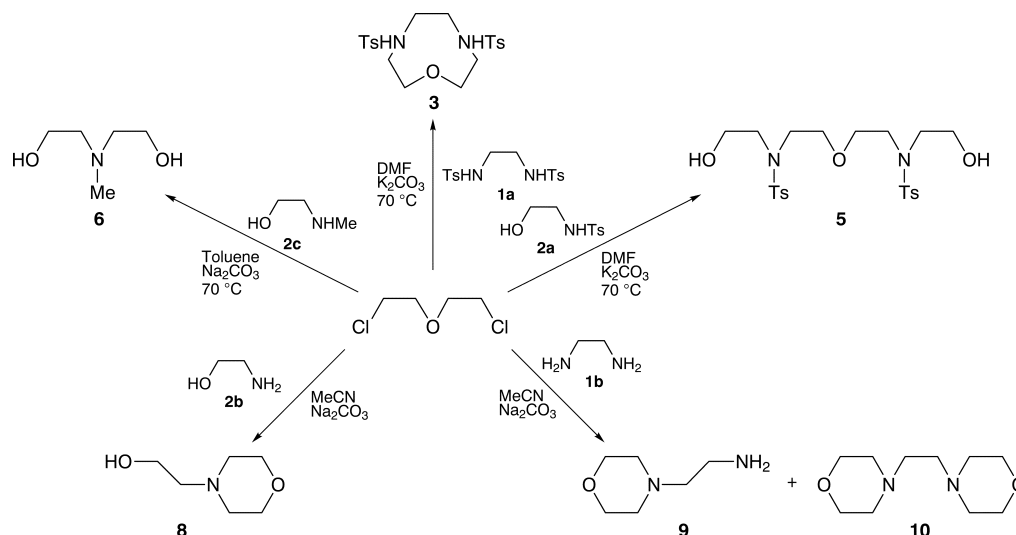
Reactivity of Bis(2-chloroethyl)ether with Different Amines

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Several unexpected compounds have been identified in the reaction between bis(2-chloroethyl)ether and some primary and secondary amines.



The synthesis of oligoethyleneglycols containing amino groups has been widely studied because of the utility of these compounds in preparing azacrown ethers.¹ One of the synthetic pathways used in these syntheses involves the reaction between primary or secondary amines and the appropriate oligoethyleneglycol dichloride.²

However, it has been established that this reaction shows an anomalous behaviour when the reagent was bis(2-chloroethyl)ether. A wide study of this reaction has been carried out and different compounds have been obtained, depending on the amine and the reaction conditions. Therefore, with *N*-methylethanolamine compound **6** was isolated under these conditions but other solvents (DMF or MeCN) gave complex mixtures of amino compounds. However, the reaction with ethanolamine always gave rise to the same product⁶ independent of the solvent or the chloride:amine ratio used in the process.

On the other hand, it was demonstrated that cyclic compounds are obtained even in presence of excess of amine.

This fact could be explained if the reaction was regulated by entropic factors.

Techniques used: 1H and ^{13}C NMR and mass spectrometry.

References: 8

Schemes: 5

Table 1: Variation in yields of **9** and **10** with amine:chloride ratio.

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