THE SYNTHESIS AND SOME OF THE PROPERTIES OF POLYALKYLENEGLYCOL-S-(ALKYL)DITHIOPHOSPHATES*

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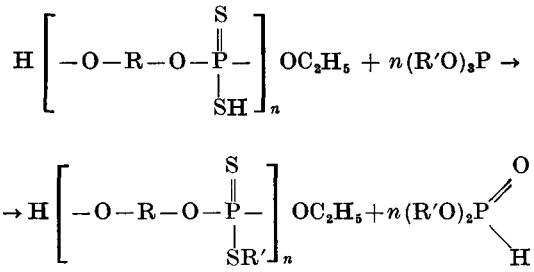
We had shown that the polyalkyleneglycoldithiophosphates produced by polytransesterification of the diethyldithiophosphate with different glycols [1] had a number of properties belonging to the dithio-acids of phosphorus. They are able to add on to the double bonds of unsaturated compounds, can be titrated with alkali as solutions in dioxane [2], i.e. they have very reactive sulphhydryl groups.

The work reported here deals with the study of a number of polyalkyleneglycoldithiophosphate reactions involving the reactive sulphhydryl groups. The reaction of trialkyl phosphites with phosphoric and phosphinic acid esters [3], and also with partial esters of dithiophosphorous acid [4], result in the full esters of these acids; the mentioned partial esters act as dealkylation agents. Some reports state that these types of compound have insecticidal properties [5, 6], are polyfunctional additives [7], and have fungicidal as well as bactericidal activity [8].

We studied the reaction of polyalkyleneglycoldithiophosphoric acid with phosphites giving polyalkyleneglycol-S-(alkyl)dithiophosphates:



The reaction was carried out with a 30% excess of the phosphite, and was accompanied by heat liberation. This was much larger in the case of the lower phosphites ($R'=CH_3$, C_2H_5). The product yield was also larger in the latter case. The completion of the alkylation was checked by back titration of the polymer sample. The characteristics of the polyalkyleneglycol-S-(alkyl)dithiophosphates (PAGDTP) are contained in Table 1.

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