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## Phosphorus, Sulfur, and Silicon and the Related Elements

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### THE MECHANISM OF INTERACTION OF SULPHUR AND p-PHENYLENEDIAMINE

Aleksander Żuk<sup>a</sup>; Maria Wejechan-Judek<sup>a</sup>; Grażyna Lewandowicz<sup>a</sup>

<sup>a</sup> Institute of Chemical Technology, Poland

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# THE MECHANISM OF INTERACTION OF SULPHUR AND p-PHENYLENEDIAMINE

Aleksander Żuk, Maria Wejchan-Judek and Grażyna Lewandowicz

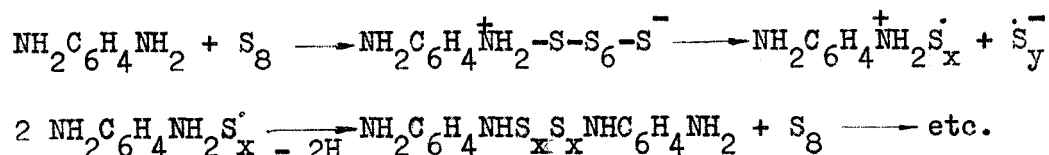
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Institute of Chemical Technology, Politechnika Poznańska

Poznań, Poland

Several studies which have been undertaken on reaction of sulphur and p-phenylenediamine give controversial proposals of mechanisms. Many authors postulate an attack of sulphur diradicals directed onto amino group.

In this work we present results of our research on reaction of sulphur and p-phenylenediamine in various mediums.

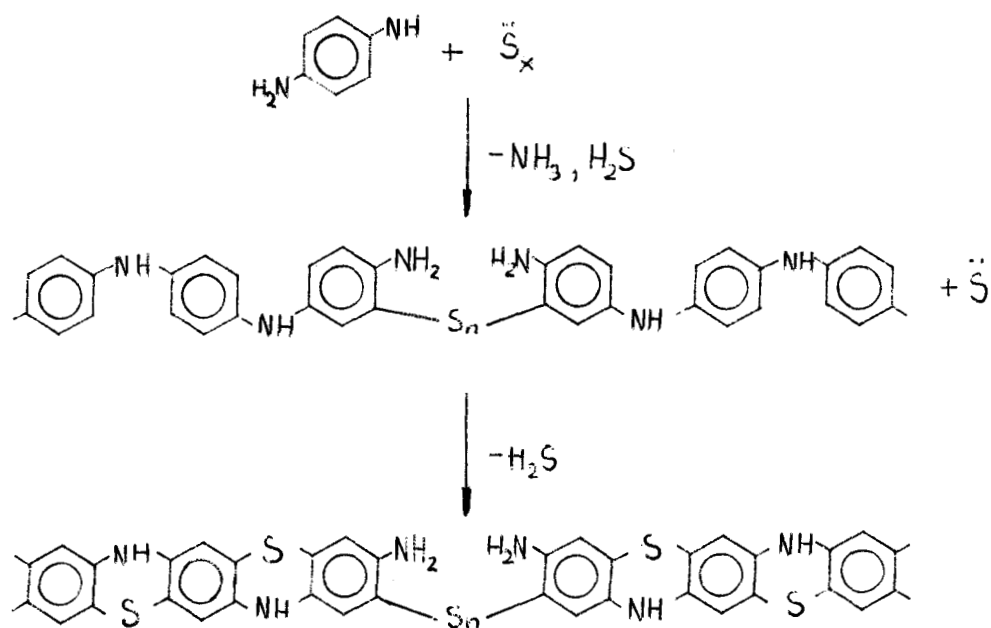
In the reaction of sulphur and p-phenylenediamine in tetralin besides polyamine sequences, the -NH-S- bonds are also formed :



From the mechanism given above it issues that in reaction carried out in tetralin, sulphur attacks a nitrogen atom.

In the case of the reaction of sulphur and p-phenylenediamine in 1-methyl-2-pyrrolidone a forming of different products was observed. It indicates the other route of reaction.

It was established that during the heating of p-phenylenediamine to the temperature of 200°C the elimination of ammonia occurs and polyamines are formed. Evolution of hydrogen sulphide was also observed which is a result of an attack of sulphur diradicals onto benzene ring. The main products are polymeric sulphides of polyamines which tend to cyclisation accompanied by forming of thiazine rings :



The obtained products we identified by means of elemental analysis, chemical methods and IR, NMR, UV spectroscopy.