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Nitro Compounds for Use in Explosive Charges

AKADEMISK AVHANDLING

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ABSTRACT

This first part of this thesis describes synthesis of and characterisation of energetic plasticisers. The general concepts and requirements of energetic plasticisers are introduced. The remainder of this part further describes the work published in three publications. The first paper included here outlines the work on derivatives of 2,2-dinitropropane-1,3-diol. The second paper contains information on synthesis attempts of other *gem*-dinitrodiols and the successful synthesis and characterisation of derivatives of 4,4-dinitroheptane-1,7-diol, *e.g.* 1,7-diazido-4,4-dinitroheptane. The third paper focuses on a new class of energetic plasticisers, namely derivatives of 3(5),4-dinitropyrazole. Two of the obtained compounds had satisfactory thermal properties to enable their use as energetic plasticisers. These two are the aforementioned 1,7-diazido-4,4-dinitroheptane and 1-allyl-3(5),4-dinitropyrazole.

This second part of this thesis describes synthesis of potentially low-sensitive explosives, *i.e.* 4-amino-3,5-dinitropyrazole in the fourth IV and 1,1-diamino-2,2-dinitroethene in the fifth paper. Both products are known. The work was directed towards process development to facilitate large scale synthesis. Four syntheses of the former were evaluated. Out of these, one was suitable for scale-up and 200 g per batch could be produced. For the latter, a new synthesis procedure without hazardous intermediated or by-products is suggested.

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