Review of diploma thesis
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Low Melting Explosives

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The thesis deals with a rather broad spectrum of low melting explosives for filling ammunition parts and for additive manufacturing. The theoretical part describes the idea of using low-melting explosives for casting explosive charges, including the requirements for these substances in general.

The ICT database is used as one of the sources for searching suitable candidates for which offers a large number of positive results for further study. Among them, there are, of course, many impractical offers, either in terms of hygroscopicity of the compounds in question, their cost, or toxicity.

What follows is a broad listing of low-melting compounds, where a truly impressive amount of data has been traced. Of the compounds listed, one might expect to find possible practical applications for the alkyl derivatives of nitroguanidine or DNDA7, for which practical synthesis routes have also recently been found. Nitroaromatics are considered toxic and perchlorates cannot be expected to be introduced into production in large quantities, nor can the relatively high cost heterocycles mentioned above.

In the practical part, a large number of compounds were synthesized, where a large amount of work is noticeable. However, a large part of the syntheses is devoted to rather theoretically interesting picrates and trinitroaniline derivatives. Picrates are relatively impractical from the point of view of the formation of hazardous metal picrates in munitions. In the evaluation, the graduate student briefly and substantively discusses the observed thermal properties of the synthesized compounds and appropriately suggests directions for further research, including testing.

In the conclusion, there is usually a broader evaluation of the results obtained and direction for further research. The graduate has mastered methods of information retrieval and orientation in large amounts of data, as well as skills in the field of explosives synthesis. She fulfilled the stated objectives of the thesis.

I recommend accepting the thesis for defence and marking it with the **B grade**.

I ask the following questions to defend the thesis:

1) Toxic dichloromethane was used in the synthesis of DNDA7. What could be substituted? How was ethylnitramine obtained?
2) Which of the synthesized compounds may be of practical interest?
3) What are the properties and expected cost of formamidine nitrate?

Pardubice 19 May 2025 Mgr. Radovan Skácel, Ph.D.