This bachelor thesis studies nanocrystalline diamonds prepared by the detonation method using various advanced analytical techniques. It further discusses the purification of the samples by multiple methods and compares their purity with industrially purified samples.

Powder diffraction was used to study the crystalline structure. Along with small-angle scattering and transmission electron microscopy, we determined the size distribution of the nanoparticles. Powder diffraction, SQUID magnetometry, and Raman spectroscopy were utilized to identify impurities. We purified the samples by thermal and acid oxidation, as well as by a combination of both methods.

The results show that the determined nanoparticle size distribution does not depend on the method used. Samples purified by combined thermal and acid oxidation showed higher purity compared to samples purified by liquid oxidation alone. The quality of the combined purified samples was comparable to the industrially purified samples, but the methods used have the potential to be more economical and environmentally friendly.

Based on the results obtained, this work provides valuable information on the structure, morphology, impurities, and purification methods of detonation nanodiamonds, which is crucial for their further application in various industries.