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Thermodynamic Simulating the Detonation Properties of CNO–Explosives SERGEY VICTOROV, SERGEY GUBIN, IRINA MAKLASHOVA, VITALY PEPEKIN, Moscow Engineering Physics Institute (State University) — In this work we predict the detonation characteristics of recently synthesized hydrogen-free high explosives containing C, N, and O atoms. This is heterocycles (nitrofurazans and nitrofuroxans) and a few other new explosives. Their initial densities and heats of formation are high and, consequently, their detonation parameters are expected to be high as well. This reason and the lack of the corresponding experimental data due to just small amounts of the synthesized matter motivate great practical interest in realistic predicting the detonation properties of these explosives. The detonation characteristics are computed with the TDS code for both new hydrogen-free explosives and a few explosive mixtures based on them. A thermodynamically consistent model is used for the solid and liquid nanoparticles of graphite and diamond. The heats of detonation and the performances of these explosive systems are calculated as well. The calculations show that the detonation parameters of the investigated explosives and explosive mixtures are very high. Furthermore, the predicted results of the metal plate test are high for these explosive systems and, hence, their performance is high. The results of this work allow us to conclude that the development of new hydrogen-free both individual explosives and explosive mixtures has considerable promise.

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