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Fast emission spectroscopy for monitoring condensed carbon in detonation products of oxygen-deficient high explosives SANDRA POEUF, CEA / Institut P', GERARD BAUDIN, MARC GENETIER, ALEXANDRE LEFRANOIS, CEA, ASHWIN CINNAYYA, Institut Pprime, CNRS, JACQUET LAURENT, CEA — A new thermochemical code, SIAME, dedicated to the study of high explosives, is currently being developed. New experimental data relative to the expansion of detonation products are required to validate the code, and a particular focus is made on solid carbon products. Two different high explosive formulations are used: a melt-cast one (RDX/TNT 60/40 % wt.) and a pressed one (HMX/Viton^{R} 96/4 % wt.). The experimental setup allows the expansion of the products at pressures below 1 GPa in an inert medium (vacuum, helium, nitrogen and PMMA). The results of fast emission dynamic spectroscopy measurements used to monitor the detonation carbon products are reported. Two spectral signatures are identified: the first is associated to ionized gases and the second to carbon thermal radiation. The experimental spectral lines are compared with simulated spectra. The trajectory of the shock wave front is continuously recorded with a high frequency interferometer. Comparisons with numerical simulations on the hydrodynamic code Ouranos have been done. These two measurements, using the different inert media, enable to make one step forward in the validation of the detonation products equation of state implemented in the SIAME code.

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