Burning of powder mixture Al+CuO under initiation of reaction by a shock wave

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Experimental data on initiation by the shock wave of chemical interaction between copper oxide and aluminum are described. Powders of starting components had mixed in stoichiometric ratio and had subjected to mechanical activation in a ball mill. Then mixture was compacted into the tablets 8 mm in diameter for tests. The initiation of chemical reaction between components of a tablet by shock impact had carried out inside the steel tube through the steel piston during detonation of the explosive charge. Explosive charges had a mass of 1 g with density of 1.15 g/cm$^3$ in all cases. The masses ratio of the explosive charge, of the piston and of the tablet were kept as 1 : 1 : 1 always. Experiments have allowed to establish that shock load and the subsequent unloading are causing dispersion of the tablet on the reacting and not-reacting clusters of components. On a cut of a steel tube all clusters are accelerating in waves of unloading. Random distribution by mass of clusters sets for them the different velocities, that leads to formation of an expanding stream of the accelerated clusters. The further process of chemical transformation occurs outside a tube with formation of expanding area of a luminous flame. Expansion in the longitudinal direction occurs with an initial velocity of 800 m/s. Diametral expansion of area occurs due by side-unload of the stream body with a velocity of 200 m/s. A relay-race initiation transfer of reaction inside not-reacting flying clusters determines the duration of combustion of a material of a tablet not less than of 5 ms. Measurement of conductivity in the area of an illumination and review of traces on the tapes have shown presence of rarefied plasma of products of reaction along with a plenty macro-, micro- and nanoparticles.