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Advantage of combined flame for synthesis of nanomaterials

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The combustion process is a complex chain chemical reaction, passing through a number of parallel elementary acts: Nucleation reactions (formation of active radicals), branching (increase in the number of radicals in the reaction), continuation and termination of the chain (radical recombination). At present, studies related to the nucleation and growth of solid carbon product in the flame indicate that the reaction routes for the formation of precursors of aromatic molecules, CnHm, are not universal for various fuels end depend on the kinetics of formation of the active radicals OH, H, O, HO_2, CH_3, C_2H, HCO, C_2H_3, ions and molecules. In the proposed study, the initial stage of combustion of each fuel is carried out on a separate burner with the possibility of subsequently combining the flames at different heights from the burner matrix to form a combined reaction zone. This makes it possible to influence the structure and property of the resulting final combustion products by combining the intermediate oxidation products of various types of hydrocarbons in the reaction zone of the combined flame. In the past years there are some works concerning synthesis methods of nanosized metal oxide particles in flames. Based on the above, in proposed work there is a purpose for investigation of nanosized metal oxide nanoparticles at joint organization of combustion process of propane and alcohol solution of metal salts. Electron microscopy studies shows that join combustion of propane and ethanol solution with nickel salt leads to the formation of nickel oxides of rounded shape with scatter in size of 50-300 nanometres. The results of chemical analysis showed the carbon content of 60%, nickel content of 36% and an oxygen content of 6%. Magnesium and sodium present in small quantities and their presence in the samples is explained by used fuel.

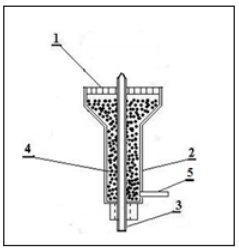

Figure-1: Scheme of burner device: 1: Perforated stabilizer, 2: Burner body, 3 and 5: Nozzles for fuel supply and 4: Balls from inert materials.

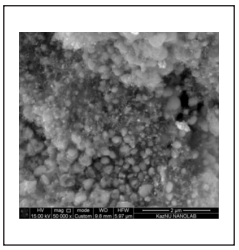

Figure-2: Electron micrograph of sample was obtained at joint combustion of propane and ethanol solution with nickel salt.

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Biography

Lesbayev Bakhytzhan Tastanovich is an Associate Professor and author of 80 publications and 9 patents. His scientific interests are chemical physic, nanotechnology, science dealing with combustion.

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