Thermal Radiation Dosimetry and Its Application in the Evaluation of Calorific Fuel Compositions

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Absorption material to ionizing radiation results in absorption of energy by matter in the form of heat energy and a corresponding increase in temperature. Absorption of radiation matter is accompanied not only by ionization of air in the reference chamber in a Geiger counter inside the dosimeter, but also an increase in temperature of the material. Hence, by measuring the temperature rise can be determined dose of radiation. This method can be used to determine the energy yield of burned in nuclear reactors on fast neutrons of radioactive waste.On the other, the thermodynamically equilibrium systems in which there are processes of isolation and heat loss (this is not the only nuclear reactors but also any heating system from the boiler to the brick furnaces) accent can be moved to the phenomenon of temperature increase. Thus, we come to the need for a temperature dose. Thermal dose - is an integral characteristic of the temperature influence on the object is equal to the area of the graph of temperature versus time. In the international system of units the temperature dose has dimension degree for a second. At negative temperatures influence is characterized by negative doses. For practice the stand-alone unit named by Stephane (St) – degree for a minute is offered. It is visible that 1 St is equal 60 degree·sec. To measure the calorific value were made antiradonic ceramic furnaces with effect of low-temperature gasification that has high efficiency, in which 10 liters of boiling water for 5-10 minutes with a mixture of dry rubber and waste wood. The area under the curve on a graph of temperature increase in water volume determines the measured value - the temperature corresponding dose S. balance equation for the water heating process is given by S=kHmt where S-temperature dose, k - coefficient of heat transfer furnace, taking into account the loss of heat from the flue gases, H-calorific fuel (J \ kg), m-fuel weight (kg), t - total time of burning fuel. Found that calorific fuel compositions larch and coal mixture, plastics, rubber, waste oil can vary in the range of 10.2 MJ / Kg to 18.8 MJ / kg. High-energy components such as rubber and plastics proportionally increase power consumption of fuel compositions