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Electro-Thermal Heating of Disperse Systems

Boiling layer is characterized by continuous and irregular movement and mixing of particles in a certain volume of height, highly developed surface of contact of the material with the air. The fluidized gases layers of particles can serve as good high temperature coolants.

The process of passing electrical current through the fluidized layer of conductive particles differ with its great complexity, as in addition to the features inherent to the phenomenon of passing electric current through the layers of immobile particles, there is influence of hydrodynamics in boiling layer.

In a substance placed in on electric field the process of elementary particles, electrons and ions, movement occurs. The movement of the electrically charged particles of matter called electric current.

The conductivity of various materials depends on the concentration of free electrically charged particles. The higher the concentration of these particles, the greater the electrical conductivity of the substance. All substances in accordance with the conductivity are divided into three groups: conductors, dielectrics and semiconductors.

Conductors have a very high electrical conductivity. There are two kinds of conductors, which are different by the physical nature of the electric current passing: metals and acid solutions, alkalis and salts, called electrolytes.

Dielectrics), while in the electric field loses its insulating properties, if the field strength exceeds a certain critical value. This phenomena is called a dielectric breakdown or loss of electric strength. Breakdown of solid dielectrics and the breakdown of gases and liquids differ from each other both by external features and physical processes

Different gases have different dielectric strength. Liquid dielectrics have high or electric strength than gas in normal conditions. There are four kinds of breakdown of solid dielectrics: electric breakdown macroscopically homogeneous dielectrics; electric breakdown of inhomogeneous dielectrics; heat (electro thermal) breakdown; electrochemical breakdown.

Paschen law is useful for evaluating the breakdown voltage in a homogeneous field, discharge ignition voltage. Shouldering discharge of direct current is widely used for the production of thin polymer and oxide films, cleaning surfaces of materials, the pumping of gas-discharge lasers, plasma display panels, voltage stabilizers and so on. Therefore investigation of the conditions for the smoldering discharge is of considerable interest.