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LIN'S THEORY OF FLUX AND NUCLEAR REACTIONS

Ping-Wha Lin

Lin Technologies, Inc.506 S., Darling Street,Angola, Indiana 46703, U.S.A.

Mathematical development of Lin's theory of flux is presented. Based on the Theory, when a chemical reaction system is subjected to a high time rate of temperature change, it changes from equilibrium to non-equilibrium conditions. It is proved mathematically that, when a gas system is subjected to a high time rate of temperature increase, the activities of particles (molecules, atoms or nuclei, and electrons) are increased: the particles are accelerated; frequencies and amplitudes of electron and atomic vibrations in a molecule increased; average kinetic energy of the particles increased; atomic bonds are ruptured; electrons are caused to leave their orbits. If most or all of the electrons leave their orbits, the gas fluid becomes plasma, which is very active chemically. The acceleration of nuclei in the dynamic condition can lead to nuclear reactions.

In the pilot plant studies conducted at Research Triangle, NC, USA, for SO_2 conversion to SO_3 by rapid heating, a 10-ft high vertically fired combustor (VFC) was used. Air containing 0.5% SO_2 is forced continuously through the VFC, where it is heated by burners for conversion of SO_2 to SO_3. During the idle period of operation, no external heat is added to the system by turning off the burners. It is observed that, as the air passing through the VFC during the idle period of sixteen hours, the temperature of the flowing air consistently rises up rapidly from ambient temperature (90^oF) at inlet of the VFC to an average temperature as high as 582^oF (in the range of 840 ^oF to 455^oF) at one section of the VFC, an increase of about 500^oF. The air flow temperature increase of such large magnitude and long duration clearly indicates that nuclear reactions are present in VFC. It is also found that the water vapour in the air stream has completely disappeared in the VFC, for no sulphuric acid formation resulting from the reaction of water and SO_3 is detected there. Presumably, the water vapour in the air is initially converted to hydrogen and oxygen by rapid heating, which further leads to nuclear reactions, involving transformation of hydrogen ions to protons. In the dynamic condition, electrons are driven off from their orbits, neutrons are released, and protons are produced from the hydrogen ions. The mutual bombardments and direct impacts between the elements of the air produce various nuclear reactions including nuclear fusion. The possible nuclear reactions are shown in the body of the paper.