

Physico-Chemical Basis of Thermal Destruction of Benzo(a)Pyrene and Reducing Their Concentration in the Gas Phase

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Abstract : Benzo(a)pyrene is widespread carcinogenic and mutagenic environmental pollutant, which is formed in combustion processes of carbonaceous materials at high temperature and still health safety problem related benz(a)pyrene continues to remain actual. At the moment the mechanisms of formation of benzo(a)pyrene are not studied in detail, there is not concrete certain full scheme of synthesis of benzo(a)pyrene. Studies in this area are mainly dedicated to development of measuring tools and chemical reactions analyzes, or to obtain specific evidence of a large group of polycyclic aromatic hydrocarbons (PAHs). Consequently in this study we try to create physical and chemical model of oxidation and thermo destruction processes of benzo(a)pyrene, using critical thermodynamical parameters in order to estimate theoretical derivatives of benzo(a)pyrene and which conditions benzo(a)pyrene degraded into more harmful substances. According to this physical and chemical modeling of thermal destruction process of benzo(a)pyrene in wide ranges of change of temperature value were calculated. C₂₀H₁₂ - H₂O-O₂ system was taken for modeling of thermal destruction process of benzo(a)pyrene in order to establish distribution range of equilibrium structures and concentrations of molecules in a gas phase. Also technological ways of reduction of concentration of benzo(a)pyrene in a gas phase were supposed.

Keywords : benzo(a)pyrene, emission, PAH, thermodynamic parameters

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