

Abstract

In combustion of molar balance data and energy balance data it is possible to determine the temperature of combustion products under any specified conditions, data from “The Chemkin Thermodynamic Data Base” were used to present computer program for the molar specific enthalpy, and the specific heat at constant pressure for eleven chemical species of the carbon-hydrogen-oxygen-nitrogen (CHON) system. The software for CHON was generated to ease the complication of using tabulated data for ideal gas properties and to easily determine aspects of combustion such as adiabatic flame temperature and equilibrium compositions of reacting ideal-gas mixtures. The details and usage of the CHON reacting system are discussed. The software can be used for different types of internal combustion engine fuels. This will ultimately result in a better physical understanding of thermodynamic cycle calculations, while at the same time providing a realistic design tool to the internal combustion engines industry. The program allows the user to easily select fuels, fuel/air ratio for the reaction, combustion products. Equilibrium composition of the fuel and air reaction was calculated according to the equilibrium chemistry routine of Olikara and Borman code to calculate the product properties. Eleven species were considered: O₂, CO₂, H₂O, N₂, H, O, N, H₂, OH, CO and NO, any type of hydrocarbon fuel can be used. There is almost perfect agreement, between the results produced by the program and data obtained by other workers in combustion field, when comparing the thermodynamic properties of the mixture of equilibrium products.

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