

Pemodelan pembakaran dan oksidasi bahan bakar B - 35 yang mengandung MTBE = Modelling of combustion and oxidation of B-35 fuel containing MTBE

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Abstrak

Pemodelan pembakaran dan oksidasi bahan bakar B-35 yang mengandung MTBE dikembangkan supaya diperoleh kondisi pembakaran optimum. Pengembangan mekanisme kinetika reaksi secara detil melibatkan 1378 reaksi elementer dan 431 spesies yang dinormalisasi menjadi 7 spesies utama dan diselesaikan menggunakan solver Chemkin melalui persamaan differensial dengan model kuasi steady state.

Perhitungan menghasilkan profil waktu tunda ignisi dan konsentrasi. Profil waktu tunda ignisi divalidasikan terhadap data percobaan Edimilson, dkk. Profil konsentrasi dibuat berdasarkan validasi waktu tunda ignisi yang optimal. Validitas dicapai pada rentang suhu 860,8 - 932,6 K, tekanan 12,87 atm dan rasio ekivalensi stoikiometri. Kondisi optimum pembakaran terjadi pada suhu 1340 K, tekanan 25 atm untuk campuran stoikiometri dan pada suhu 1325 K, tekanan 25 atm untuk campuran lean fuel.

Modelling of combustion and oxidation of B-35 fuel containing MTBE has developed to reach the optimum combustion. Development of mechanism of kinetic reactions in detail consist of 1378 elementary reactions and 431 specieses which normalized into 7 main specieses and solved by Chemkin through differential equations by steady state quation model.

Results of the calculation are ignition delay time and concentration profiles. Ignition delay time profiles is validated with Edimilson, et. al. data experiment. Concentration profiles is made according to optimum ignition delay time profiles. Temperature validity reached at 860,8 - 932,6 K, 12,87 atm of pressure and stoichiometric equivalence ratio. Optimum condition of combustion reached at 1340 K of temperature, 25 atm of pressure in stoichiometric equivalence ratio and 1325 K of temperature, 25 atm of pressure in lean fuel equivalence ratio.