particles in the beam. For all conditions, closely overlapping signals of silicon, silicon carbide and hydrocarbon species with nearly identical masses have been resolved. In an effort to reduce fragmentation, laser fluence was lowered at the cost of degrading signal-to-noise. One of the main challenges in these measurements was plugging of the sampling orifice with silicon-carbide. While these initial experiments point to improvements that are necessary before reliable process characterization can be performed they also highlight the capabilities of the employed method to obtain a better understanding of the reaction process as a function of temperature, precursor flow and pressure.
The same technique was employed to study the pyrolysis of toluene as a function of temperature between 300–1500 K. Preliminary results from these experiments will be shown to demonstrate the versatility of the diagnostic technique.

Erdal Akyildiz: erdal.akyildiz@uni-due.de

W1P103: THEORETICAL ANALYSIS OF THE BURNING OF A LOW-VOLATILITY LIQUID FUEL IN A LOW-POROSITY MEDIUM

Max Endo Kokubun, Fernando Fachini, Instituto Nacional de Pesquisas Espaciais, Brazil

In this work, an analytical model of the burning of a low-volatility liquid fuel within a low-porosity medium is presented. The liquid fuel is subjected to an impinging stream of oxidant and a diffusion flame is generated. The Schvab-Zel'dovich formulation is employed, and by taking advantage of the existence of boundary-layers in the system (due to the differences on the phases transport-properties), an asymptotic analysis is performed in order to obtain the profiles. Thermal non-equilibrium between phases is considered such that the interphase heat exchange is intense. The problem unknown values (flame temperature, vaporization rate, solid phase temperature at the interface, fuel mass fraction at the interface and flame position) are obtained and analyzed. The interaction between the unknowns is non-linear, own to the complexity of the coupled physical processes. The influence of the porous medium properties and of the flow strain in the unknowns is discussed. High flame temperatures are achieved due to the heat recirculation induced by the solid matrix. The results also show that the enhanced heat flux due to the solid matrix is the process that allows for the vaporization of the low-volatility liquid fuel. The proposed model represents a local analysis of the *in-situ* combustion process (thermal oil recovery method).

Max Endo Kokubun: max@lcp.inpe.br

W1P104: EFFECTS OF HIGH MAGNETIC FIELD PRETREATMENT ON THE PROPERTIES OF PULVERIZED COALS COMBUSTION

Pei Fang Fu, Q. Wang, Z.C. Xia, H.C. Zhou, Huazhong University of Science and Technology, China

As an extreme condition, imposition of a high magnetic field conduces to the discovery of new phenomena, better understanding of previous experimental results, and effective promotion of new industrial technology. Actually, the magnetic field can significantly affect the combustion of gaseous fuels, which has been verified by numerous experiments and formulated with comparatively complete theories. However, a few experiments have shown that the ignition temperature decreases, reactivity increases at initial stage and the degree of burn-off decreases when the pulverized coal is pretreated under low magnetic field intensity (< 0.15T). But what would take place when the pulverized coal is under extreme high magnetic field condition? Three different coal banks including SLH lignite, ZCY bituminous coal, and JWY anthracite were immersed respectively in the pulse magnetic field up to 30 T with a pulse duration of 10 ms at room temperature. The pulse high magnetic field facility of the Wuhan National High Magnetic Field Center is shown. The thermogravitic analysis was performed from ambient temperature up to the maximum temperature of 1173 K at the constant heating rate of 10 K/min by using the NETZSCH STA409 thermal analyzer. The air flow rate is 100 ml/min, the particle sizes are about 37–74μm, and the weight of sample is 5 ± 0.2mg.

Pei Fang Fu; pffu@mail.hust.edu.cn

W1P105: MODELLING PYROLYSIS AND GASIFICATION OF THICK BIOMASS PARTICLES

Kamil Kwiatkowski[1], Wojciech Gryglas[2], Jakub Korotko[2], Pawel Zuk[1], Marek Dudyński[3], Konrad Bajer[1]
[1]University of Warsaw, Poland [2]Warsaw University of Technology, Poland
[3]Modern Technologies and Filtration Sp., Poland