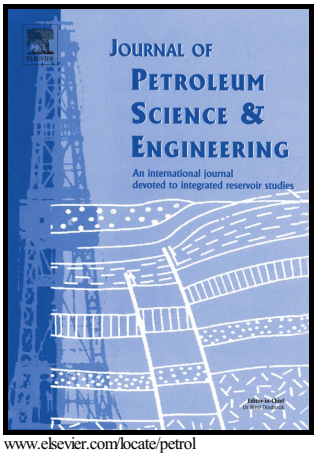

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ABSTRACT

In this research, combustion characterization and kinetics of four different origin crude oil samples were determined using thermogravimetry - differential thermal analysis (TGA-DTA) and thermogravimetry - Fourier transform infrared (TGA-FTIR) and thermogravimetry – mass spectrophotometry (TGA-MS) techniques.

In the TGA-DTA analysis of crude oil samples, low temperature oxidation (LTO) and high temperature oxidation (HTO) reaction regions were observed in different temperature intervals. On the other hand, reaction regions, mass loss, and peak-burnout temperatures of the crude oil samples were also determined using TGA-DTA curves. In TGA-FTIR analysis, spectrums of crude oil samples were examined at different time intervals and composition of several hydrocarbon compounds was determined quantitatively. This research was also focused on the main volatile products (H_2, H_2O, CO, CO_2, C_6H_6, SO_2 etc…) of different origin crude oil samples on the basis of both their relative intensities and on their relevancy by using TGA-MS technique.

Two different Arrhenius types of kinetic models were used in order to determine the kinetic triplets (activation energy, Arrhenius constant and reaction order) of crude oil samples studied. It was observed that in HTO region, higher activation energy values were observed depending on the ^{o}API gravities of the crude oils.

Keywords: Crude oil, combustion, thermogravimetry, Fourier-transform infrared, mass spectrophotometry, kinetics

1. INTRODUCTION

Applications of thermal analysis techniques have advantages over other methods of investigation, being simpler to perform and more readily amenable to characterization and kinetic analysis from the point of

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