Referaat

The main aim of this theses is to do a research on a shale oil composition, thermodynamic properties and methods. Shale oil thermodynamic properties and composition depends on how it is extracted from oil shale. To get shale oil from shale rock is to treat it thermally in a oven and then condense hydrocarbon vapors. There are many different equipments for oil shale composition. Nowadays there are two techniques used in Estonia. First technique needs a solid carrier (hot ash) to burn oil shale (called Galoter process) and the second technique needs hot gas (called Kiviter process). Also there were many other equipments that were used in Estonia: tunneloven, Davidson retort and chamber oven. Shale oil composition also depends on shale rock region (different country shale rock have different composition- Table 1 and 2).

Comparing shale oil to crude oil, the shale oil is more aromatic than crude oil. Also we can find olefins in shale oil composition, but usually there are no olefins in crude oil. Comparing shale oil to coal liquid, the coal liquid consists more aromatic hydrocarbons, but less olefines than shale oil.

Shale oil research was done using Kogerman and Kõll (1930 y.) shale oil fractions data, what was produced with Kiviter testretort. Shale oil fractions boil up to 300 ^{0}C. Also shale oil data (used different techniques to produce shale oil) were obtained from Kollerov (1951 y.) and Luts (1944 y.) book. The data was collected and used to calculate using crude oil formulas, because shale oil has not been studied that much than crude oil and there are not many formulas for shale oil, which fit to calculate shale oil thermodynamic properties. Calculated shale oil properties were compared to experimental data. Since there were not many shale oil experimental data therefore many thermodynamic properties could not been calculated. Main properties, that could compared to experimental data were molar mass and specific gravity. Comparing calculated molar mass to measured value, the best was Kollerov nomogram, Luts's formula and Goossens correlation, because the differences were not that big (up to 10% in a hole fraction). The least suitable was Riazi-Daubert and Grey-Holder methods, because the results were considerable high (differences between calculated and experimental data were over 100%). Comparing calculated specific gravity to measured value, the best were Riaz-Daubert methods (specific gravity formula for light and heavy fractions), which differed from

Kogerman and Kõll experimental data up to 3%. Other specific gravity formulas differed up to 9% .

This research gives only idea what formulas can be suitable for calculating kukersite shale oil thermodynamic properties, because these formulas need more experimental data to understand and compare if they are suitable or not.