— University of Mosul —
College of Petroleum & Mining Engineering

# Title of the lecture

## Lecture Five

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# 4. Physical Property Characterization Data

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## 4.1. Fractionation

Distillation of crude oils determines the yield of the products that can be obtained from this crude oil when it is processed in a refinery. A light crude oil will produce higher amounts of gasoline than a heavier crude oil. Different standard distillation tests can be performed on crude oil or petroleum fractions.

# 4. Physical Property Characterization Data

## 4.2. True Boiling Point Distillation

The boiling point distribution of crude oil (boiling point versus volume or mass percent distilled) is obtained through a batch distillation test ASTM 2892. The distillation apparatus has 15–18 theoretical plates with a 5:1 reflux ratio. For boiling points below 340C (644 F) the distillation is performed at atmospheric pressure. The residue is distilled under vacuum (1–10 mm Hg). The boiling points under vacuum are converted to normal boiling points. The distillation continues to a normal boiling point of 535 C (995 F). This test allows for the collection of sample cuts at different boiling point ranges.

# 4. Physical Property Characterization Data

## 4.3. ASTM Distillation

The distillation of petroleum cuts is done in a simple distillation apparatus which does not have a fractionation column. For light cuts (gasoline, kerosene, diesel and heating oil) the distillation is run at atmospheric pressure under ASTM D86 test. For heavier fractions an ASTM D1160 test at reduced pressure is employed.

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## 4.4. Simulated Distillation by Gas Chromatography

The boiling point distribution of the whole crude oil can be determined by an injection of the sample in a gas chromatograph which separates the hydrocarbons in boiling point order. The retention time is related to the boiling point through a calibration curve. The results of this test are comparable to the true boiling point tests. In addition, the boiling point distribution of light and heavy petroleum cuts can also be done by gas chromatography. One of the standards methods of measurements is ASTM D5307.