

**SOUTH – KAZAKHSTAN STATE UNIVERSITY** Named after M.AUEZOV  
**HIGHER SCHOOL «CHEMICAL ENGINEERING AND BIOTECHNOLOGY»**  
**DEPARTMENT «CHEMICAL TECHNOLOGY OF INORGANIC SUBSTANCE»**

# Presentation

*Methods for processing of liquid waste*

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# *Plan*

*Types of liquid waste and treatment methods*

*Steam and rectification*

*Chemical processing*



*Ластанған  
еріткіштер*

*Шайынды және де  
ағызынды сулар*

*Әртүрлі  
филтраттар*

*Өндірісте көп жағдайда  
сұйық қалдықтар пайда  
болады. Сұйық  
қалдықтарға мыналар  
жатады:*

*Іркінді сулар*

*Скрубберден  
шыққан сұйықтар*

*Жұмыстан шыққан  
қышқылдар, майлар  
және органикалық  
жылуөткізгіштер*



Сұйық қалдықтар

*Гомогенді (еріткіш)*

*Гетерогенді  
(эмульция – еріткіш  
тамшы, суспензия -  
жүзінде)*

*Solution can be classified into two groups:*

**Біріншісі - заттар ерітіндісі бар органикалық сұйықтар**

*Органикалық сұйықтарды қуалайды немесе кристалдауға ұшыратады.*

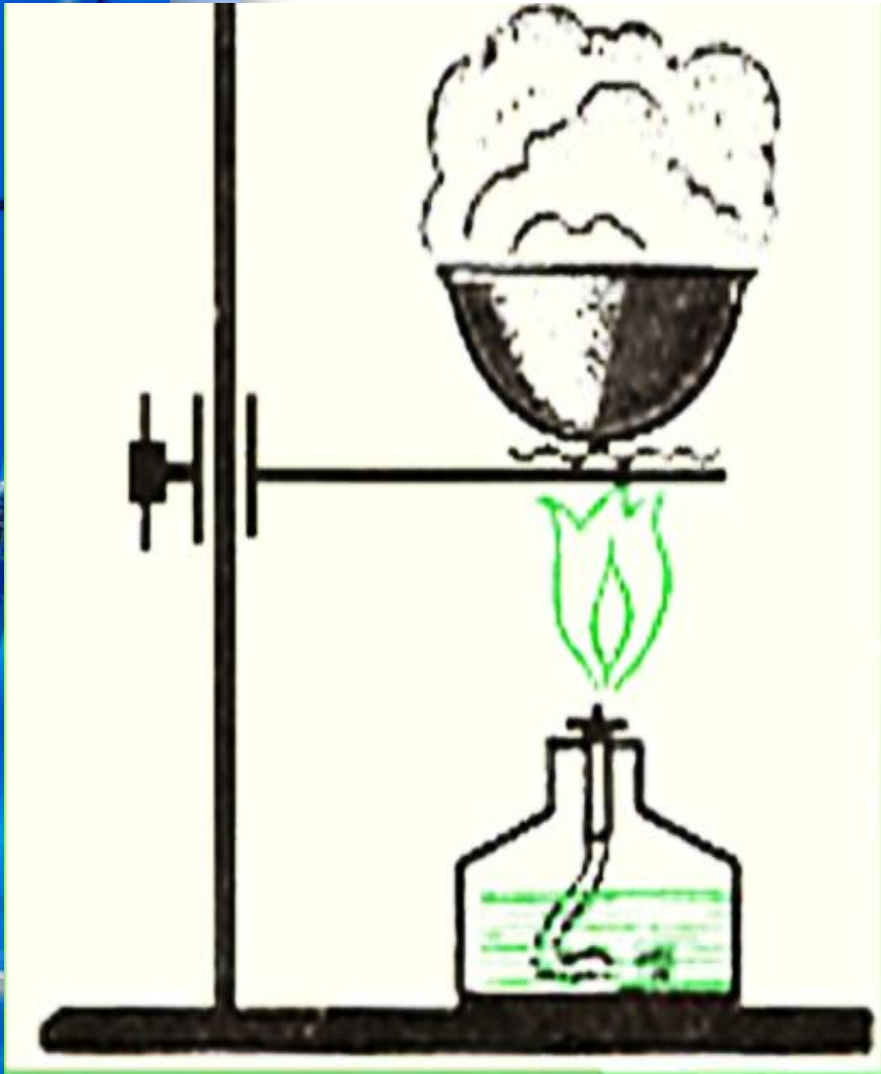
*Судағы ерітіндіні (тұздар, қышқылдар, негіздер) буландырады да шогырын жоғарылатады, сонымен қатар судағы еріген заттарды бөліп алады.*

**Екіншісі - судағы ерітінділер**



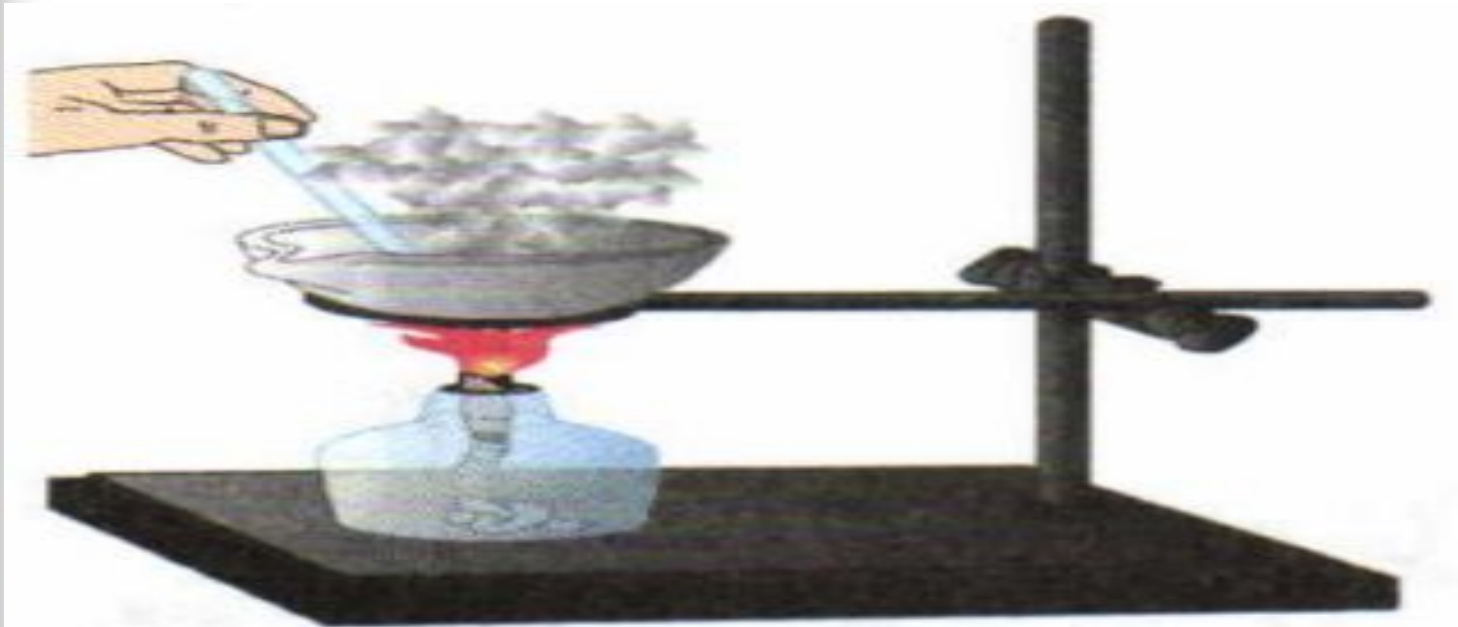


# *Evaporation (dehydration)*



- **Steam** is water in the gas phase, which is formed when water boils. Steam is invisible; however, "steam" often refers to wet steam, the visible mist or aerosol of water droplets formed as this water vapour condenses. At lower pressures, such as in the upper atmosphere or at the top of high mountains, water boils at a lower temperature than the nominal 100 °C (212 °F) at standard pressure. If heated further it becomes superheated steam.

Steam is traditionally created by heating a boiler via burning coal and other fuels, but it is also possible to create steam with solar energy. Water vapor that includes water droplets is described as *wet steam*. As wet steam is heated further, the droplets evaporate, and at a high enough temperature (which depends on the pressure) all of the water evaporates and the system is in vapor-liquid equilibrium.







- *Composition of water;*



- *Surface area;*



- *temperature;*



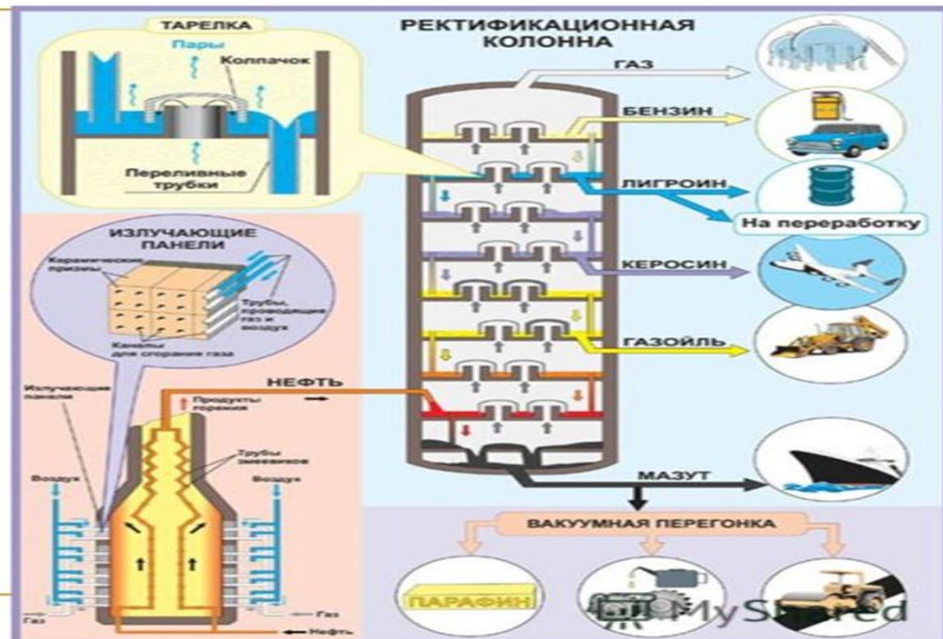
- *to the speed of the wind.*



# Fluid transfer process

One of the most frequently used methods for separating homogeneous liquid impurities, consisting of two or more components, is the process of distillation (distillation and rectification)

## Ректификация нефти

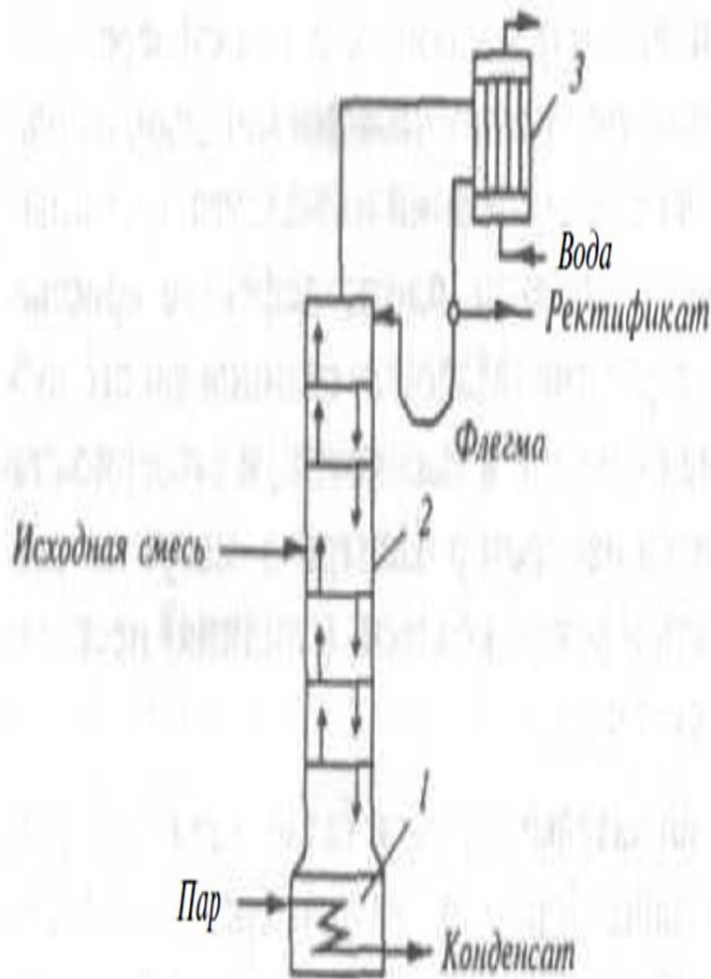




# Rectification

Rectification is the process of converting bidirectional current flow to unidirectional current flow. The process is of vital importance in many areas of circuit design, including radio communication and AC to DC power conversion.

# Rectification columns



*Part of the rectification column is called distillation or rectification. The second part is called the flegm, which is transmitted to the information again. The fluge (re-injected fluid) is mainly composed of Tc and is contacted with a raised bulb above the collon.*