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Catalytic processing of the light pyrolysis resin

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Despite the significant absolute production volumes of coke-chemical benzene, as well as huge potential capabilities of obtaining C6H6 from natural gas processing products, the main source of raw materials for the production of benzene is currently hydrocarbon fractions of oil origin. Here, benzene and toluene can be considered target products. This is because, on the production consuming this product, the volume of products has been growing.

In the world, about half of the entire benzene produced is obtained from pyrolysis resin gasoline. Aromatic hydrocarbons, in particular benzene, are extremely popular in the petrochemical industry.

In recent years, a rapid increase in demand for benzene is observed, both in the world market and in the market of Azerbaijan petrochemistry. In this paper, special attention is paid to the possibility of using several fractions of liquid products of Pyrolysis of EP-300 type facilities (Azerbaijan). To date, the production of aromatic hydrocarbons from liquid pyrolysis products is very advantageous and promising. The cost of the benzene obtained from the pyro-condensate according to known data is much lower (by 1.3-1.5 times) than with catalytic reforming. Up to 75% of the by-products of the EP-300 are light resins. According to the analysis (Agilent Technologies 7820 gas chromatograph), it can be concluded that light resins include 32-39% benzene, 14-17% toluene, styrene, and xylene. 45% of the world's

benzene production is obtained by processing light resin. Given the abundance of by-products in the pyrolysis process and the richness of aromatic hydrocarbons, it can be said that the processing of light pyrolysis resin as a raw material for obtaining various reagents is relevant today. Thermal and catalytic hydrodealkylation processes of BTX (benzene-toluene-xylene) hydro-stabilized and hydrotreated pyro-condensate fraction, which require large energy, material, and capital consumption worldwide, are applied to this issue as a solution. Catalytic treatment is the most important stage of these processes and currently, quite expensive catalysts Pt, Pd, etc. are used in this stage. A complex aluminum chloride catalyst based on toluene was developed in the laboratory of our institution, and its effect on light pyrolysis tar was studied. The dependences of the change in the proportion of benzene in light resin, on the amount of catalyst, temperature, and duration of contact, were found, as a result of which the optimal conditions for the process were determined, which allows achieving a significant increase in the proportion of benzene in light pyrolysis resin. The results of the process of catalytic treatment of pyro-condensate show that the mass share of benzene in the system increases by 10 percent. Processes for treating the light resin with other catalysts were carried out and compared with the results carried out with a complex catalyst.

It was determined that the mass share of benzene in the system increases by 6-7% during catalytic treatment with tret- Butyl ethyl ether.

1. Reactor (light resin)

2. Catalyst

3. Condesate

4. Cube

5. Mixer

6. Condenser

In this experiment, after catalytic treatment, the light resin was rectified and the benzene fraction was separated and directed to the next stage for the synthesis of high-purity benzene, and the obtained cube was processed into petroleum polymer resin. Petroleum polymer resin is the main raw material that forms the basis of varnish production. The scheme of the processing process is shown in the figure

Biography

Shafiga Alieva is researcher in Institute of Catalysis and Inorganic Chemistry named after M. Nagiyev, NAS of Azerbaijan. Since 2019, Shafiga Alieva has been researching efficient processing methods for light resin, a by-product of ethylene production, and has developed complex and efficient processing schemes. Along with the main products, by-products can be processed, returned to production and very valuable (benzene, toluene, paint materials) can be bought..