
10 万吨/年己二腈工艺设计

摘要

本次设计采用催化剂为零价 Ni 和含 P 配体组成的配合物。具体工艺如下：在 110℃、1.5MPa 反应条件下，丁二烯和氢氰酸在催化剂作用下，在一级氢氰化反应器中发生反应，生成戊烯腈，反应液经过回收、精馏后塔顶反应液进行异构化反应，塔釜反应液送入二级氢化反应器。异构化反应结束后经过回收和精馏后进行二级氢氰化反应，之后经过闪蒸精馏后，从塔的底部得到所要的产品。

根据氢氰酸、丁二烯和己二腈的结构以及给定的压力和温度，采用 Aspen plus 对原料及其主要产品的物理性能进行了评价。根据 Aspen Plus 模拟的数据进行物料能量衡算以及设备设计。设备设计包括反应釜，精馏塔的设计，泵以及换热器选型。还要进行相应车间布置，自动控制三废处理，公用工程等等。

关键词：丁二烯；己二腈工艺设计；aspen plus。

Process design of 100000 t / a adiponitrile

Abstract

In this design, the catalyst is a complex composed of zero valent Ni and P-ligand. The specific process is as follows: under the reaction conditions of 110 °C and 1.5MPa, butadiene and hydrocyanic acid react in the primary hydrocyanic reactor under the action of catalyst to generate pentene nitrile. After recovery and rectification, the reaction liquid at the top of the tower is isomerized, and the reaction liquid at the bottom of the tower is sent to the secondary hydrogenation reactor. After the isomerization reaction is completed, the secondary hydrocyaniding reaction is carried out after recovery and rectification, and then the product is obtained from the bottom of the tower after flash distillation.

According to the structure of hydrocyanic acid, butadiene and adiponitrile, as well as the given pressure and temperature, the physical properties of raw materials and their main products were evaluated by Aspen plus. According to the data simulated by Aspen Plus, the material energy balance and equipment design are carried out. The equipment design includes the design of reactor and distillation tower, the selection of pump and heat exchanger. In addition, the corresponding workshop layout, automatic control of three wastes treatment, public works, etc.

Key words: Butadiene; adiponitrile process design; Aspen plus.

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