

44. An Introduction to Distillation (蒸馏概述) 1. Petroleum refining is the separation of petroleum into fractions and the subsequent treating of these fractions to make them into petroleum products. Most petroleum products, including kerosenes, fuel oils, lubricating oils, and waxes, are fractions of petroleum that have been treated to remove undesirable components. Other products, for example, gasolines, aromatic solvents, and even some asphalts, are totally or partly synthetic in that they have compositions that are impossible to achieve by direct separation of these materials from crude petroleum. They result from chemical processes that change the molecular nature of selected portions of crude petroleum. In other words, they are the products of refining or they are refined products.

1、石油炼制即将石油分离成各种馏分，然后将这些馏分经过处理，制成各种石油产品。大部分石油产品，包括煤油、燃料油、润滑油和石蜡，都是原油经过处理去掉不需要的成分而得到的石油馏分。其他石油产品，如汽油、芳烃溶剂、甚至包括有些沥青，则是通过完全或者部分合成而制造的。因为组成这些产品的物质成分无法通过直接分离原油获得，而是通过化学反应过程，从原油中选定某些成分并改变其分子属性而获得的。换言之，它们是通过炼制得到的，或称为炼制产品。

2. Refining petroleum is a complex series of steps by which the original crude material is eventually converted into salable products

with the desired qualities and, perhaps more important, in the amounts dictated by the market. 2、石油炼制包含一系列复杂的过程。通过这些过程，石油原料最终转化成为可销售的产品。这些产品在质量上符合人类需要，而更重要的是它们在数量上符合市场要求。 3. In fact, a refinery is essentially a group of manufacturing plants that vary in number with the variety of products produced. refinery processes must be selected and products manufactured to give a balanced operation: that is, crude oil must be converted into products according to the rate of sale of each. For example, the manufacture of products from the lower boiling portion of petroleum automatically produces a certain amount of higher boiling components. If the latter cannot be sold as, say, heavy fuel oil, they accumulate until refinery storage facilities are full. To prevent the occurrence of such a situation, the refinery must be flexible and able to change operations as needed. This usually means more processes—a cracking process to change an excess of heavy fuel oil into more gasoline with coke as the residual product or a vacuum distillation process to separate the heavy oil into lubricating oil stocks and asphalt to accommodate the ever-changing demands of the market. 3、实际上，炼油厂从根本上说是一组生产装置，其数量根据生产产品的不同而不同。炼油工艺须经选择，产品生产应该平衡：即从原油生产产品必须依据每一产品的销售速度而进行。比如，从沸点较低的组分生产石油产品，就会自动产生一定数量的高沸点产品。如果高沸点产品，如重燃料油，无法销售，这些产品就会积压，直到装满炼厂的储存设施。要避免这种情况出现，炼厂应采取灵活

措施，并能够根据需要改变操作。一般而言，这意味着需要更多的工艺以适应不断变化的市场需求：运用裂化工艺将过剩重燃料油转化成汽油，而焦炭成为残余品；或者运用真空蒸馏工艺将重油分解成润滑油和沥青。

4. In addition, a complete refining installation must include the following: all necessary non-processing facilities. adequate tankage for storing crude oil, intermediate, and finished products. a dependable source of electrical power, material-handling equipment. workshops and supplies for maintaining a continuous 24 h/day, 7 day/week operation. waste disposal and water-treating equipment. and product-blending facilities.

4、此外，一套完整的炼油装置须包括以下设备：所有必须的非工艺设施：足够的储罐容量用以储存原油、中间产品和成品；可靠的电力和物质处理设备来源；用于维持一天24小时，一周七天连续运转所需的车间和物资；废料和污水处理设备；以及产品调合设施。

5. In the early stages of refinery development, when illuminating and lubricating oils were the main products, distillation was the major and often only refinery process. At that time, gasoline was a minor, but more often unwanted, product. As the demand for gasoline increased, conversion processes were developed because distillation could no longer supply the necessary quantities.

5、在早期炼油工业发展过程中，照明用油和润滑油是主要的产品，蒸馏则成了主要的甚至经常是唯一的炼油工艺。当时，汽油本身尽管不是重要产品，但也常讨人嫌。随着市场对汽油需求的增加，产品转化工艺随之发展，因为蒸馏已不能满足对汽油的数量需求。

6. Nevertheless, distillation has remained a major refinery

process and a process to which just about every crude that enters the refinery is subjected. A multitude of separations are accomplished by distillation, but its most important and primary function in the refinery is its use for the separation of crude oil into component fractions. 6、但是，蒸馏仍然是重要的炼油工艺，而且所有原油进入炼厂都必须经过蒸馏。许多分离过程是通过蒸馏进行的，但蒸馏在炼油厂中的最重要和主要的功能则是它在将原油分离成不同馏分过程中的作用。 7. Thus it is possible to obtain products ranging from gaseous materials taken off the top of the distillation column to a heavy residue or “bottom”，which is usually nonvolatile, with correspondingly lighter materials taken off at intermediate points. However, the majority of crude oils, and this applies to the heavier, more viscous petroleums, which are processed by distillation, are usually separated into the lighter fractions (gas, gasoline, naphtha, kerosene, and gas oil) and the bottom or, as it is more generally called, the reduced crude. 7、由此，我们有可能获得石油产品，这些产品包括从蒸馏塔顶部得到的气态物质，包括比重较大的渣油或称“残渣”（一般而言挥发性较差），以及从蒸馏塔中部得到的比重较小的其他相应物质。但是，经过蒸馏处理的大多数原油，包括比重较大、粘度更大的原油，一般都分离为较轻组分（气、汽油、粗汽油、煤油和粗柴油）和残渣，或者更多称作常压重油。 8. The reduced crude may then be processed by vacuum or steam distillation to separate the high-boiling lubricating oil fractions without the danger of decomposition, which occurs at high (>350 , 660) temperatures. Indeed, atmospheric distillation may be terminated with a lower

boiling fraction (“ cut ”) if it is thought that vacuum or steam distillation will yield a better quality product or if the process appears to be economically more favorable. 8、然后，通过真空蒸馏或蒸汽蒸馏，常压重油可以分离成高沸点润滑油组分而没有分解的危险。这种分离在高温状态下进行(>350 ， 660)。如果认为真空蒸馏或蒸汽蒸馏生产的产品质量更好，或者从经济角度看更为有利，则低沸点组分分离出来后，常压蒸馏即可结束。 100Test 下载频道开通，各类考试题目直接下载。详细请访问 www.100test.com