

中国石油职称英语考试通用教材电子版（2007年）五十四

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54. An Introduction to Petrochemicals (石油化工产品概述) 1. The petroleum era was ushered in by the 1859 finding at Titusville, Pennsylvania, but the flourishing of chemicals from petroleum has been only since the early twentieth century. Natural gas and petroleum are in fact our chief sources of hydrocarbons. Natural gas is quite variable in composition, but the major constituent (>60%) is methane. Other components are the homologous alkanes, ethane, propane, and higher hydrocarbons. In terms of volume, most of the natural gas produced is used for fuel, although a substantial amount is used as raw material for the synthesis of various types of chemicals. 1、1859 宾西法尼亚洲Titusville地区钻出油井，开创了石油时代。但从石油中成功地提取化学产品，则直到20世纪早期才开始。实际上，天然气和石油是我们碳氢化合物的主要来源。天然气在成分上不大稳定，但主要成分(60%)是甲烷。其他组分有同系烷、乙烷、丙烷以及高分子碳氢化合物。从数量看，尽管有相当数量的天然气用作各种合成化合物的原料，但所生产的大多数天然气用作燃料。 2. The chemical industry depends very heavily on petroleum, natural gas, and natural gas liquids as sources of raw materials. It is likely that in excess of 90% of the literally thousands of different basic organic chemicals employed today are derived from these sources. 2、化学工业的原材料来源严重依赖石油、天然气和液态天然气。当今所应用的上千种

不同的基本有机化学产品中很可能有超过90%的产品来自这些资源。

3. The petrochemical industry has grown with the petroleum industry and is considered by some to be a mature industry. However, as is the case with the latest trends in changing crude oil types, it must also evolve to meet changing technological needs.

3、石油化学工业是随着石油工业发展起来的，而且有人认为已是一个成熟的工业部门。然而，从原油类型变化的最新趋势来看，石油化学工业同样需要进一步发展以适应技术发展的需要。

4. The manufacture of chemicals or chemical intermediates from petroleum and natural gas constituents is an excellent example of the conversion of such materials to more valuable products. The individual chemicals made from petroleum and natural gas are numerous and include industrial chemicals, household chemicals, fertilizers, and paints, as well as intermediates for the manufacture of products, such as synthetic rubber and plastics.

4、从石油和天然气组分中生产化学产品或化学中间产品极好地证明了这些物质能够转换成更有价值的产品。从石油和天然气提取的单个化学产品数量众多；包括工业产品、家庭用品、化肥、油漆、以及用于生产其他产品的中间产品，如合成橡胶和塑料。

5. The processing of petroleum hydrocarbon to yield materials that are, essentially, the building blocks of other chemicals industries, is now very extensive.

5、石油碳氢化合物通过加工所生产的物质，基本上其他化学工业的预制品，这种加工目前范围十分广泛。

6. Petrochemicals are generally chemical compounds derived from petroleum either by direct manufacture or by indirect manufacture as by-products from

the variety of processes that are used during the refining of petroleum. Gasoline, kerosene, fuel oils, Lubricating oils, waxes, asphalts, and the like are excluded from the definition of petrochemicals, since they are not, in the true sense, chemical compounds but are in fact intimate mixtures of hydrocarbons.

6、石化产品一般指直接或间接地从石油中提炼的化合物，这些化合物往往是石油炼制各种过程中产生的副产品。汽油、煤油、燃料油、润滑油、石蜡、沥青以及诸如此类的产品不属于石化产品。因为，从严格意义上说，它们不是化合物，而是烃类的均质混合物。

7. The classification of materials such as petrochemicals is used to indicate the source of the chemical compounds, but it should be remembered that many common petrochemicals can be made from other sources, and the terminology is therefore a matter of source identification.

7、象“石化产品”这样的物质分类用来表明化合物的来源。但应记住，许多我们所熟知的石化产品也可以通过其他途径生产，因而这一名称只是用来识别原料。

8. The starting materials for the petrochemical industry are obtained from crude petroleum in one of two general ways. They may be present in the virgin petroleum and as such, are isolated by physical methods, such as distillation or solvent extraction. On the other hand, they may be present in trace amounts and are synthesized during the refining operations. In fact, unsaturated hydrocarbons, which are not usually present in virgin petroleum, are nearly always manufactured as intermediates during the various refining sequences.

8、石化工业的初始原料大概通过一到两种方法从原油中提取。这些原料物质，也许本身就存

在于原油当中，因此通过物理方法加以分离，如蒸馏和溶取。同时，这些物质也可能因含量低而在炼制作业中生成了合成物。实际上，原油中一般不存在非饱和烃，几乎所有的非饱和烃都是在各种炼制过程中作为中间产品而产生的。 9.

The manufacture of chemicals from petroleum is based on the ready response of the various compound types to basic chemical reactions, such as oxidation, halogenation, nitration, dehydrogenation, addition, polymerization, and alkylation. The low-molecular-weight paraffins and olefins, as found in natural gas and refinery gases, and the simple aromatic hydrocarbons have so far been of the most interest because it is these individual species that can readily be isolated and dealt with. A wide range of compounds is possible, many are being manufactured, and we are now progressing the stage in which a sizable group of products is being prepared from the heavier fractions of petroleum. For example, the various reactions of petroleum heavy ends, in particular the asphaltenes, indicate that these materials may be regarded as chemical entities and are able to participate in numerous chemical or physical conversions to, perhaps, more useful materials. The overall effect of these modifications is the production of materials that either afford good-grade aromatic cokes comparatively easily or the formation of products bearing functional groups that may be employed as a nonfuel material. 9、从石油生产化学品的依据是各种类型的化合物对各种基本的化学作用感应迅速，如氧化作用、卤化作用、硝化作用、脱氢作用、添加作用、聚合作用和烷基化作用。迄今为止，人们最感兴趣的是从天然气和炼厂气中所得

到的低分子量石蜡和稀烃，以及简单芳烃，因为这些物质能够进行迅速分离和处理。大量化合物都有望得到、其中许多化合物正在生产。目前我们正在探索如何从石油的重质馏分中提炼数量可观的产品。比如，石油重质尾部馏分，尤其是沥青质的各种反应表明这些物质可以看成化学本质，也许能够通过各种化学和物理反应转变成更有价值的产品。这些变化的总体效应是，所生产的物质，或者能够相对容易地提供高品质芳焦，或者能够形成功能族产品，用作非燃料材料。

10. For example, the sulfonated and sulfomethylated materials and their derivatives have satisfactorily undergone tests as drilling mud thinners, and the results are comparable to those obtained with commercial mud thinners. In addition, these compounds may also find use as emulsifiers for the in situ recovery of heavy oils. There are also indications that these materials and other similar derivatives of the asphaltenes, especially those containing such functions as carboxylic or hydroxyl, readily exchange cations and could well compete with synthetic zeolites. Other uses of the hydroxyl derivatives and / or the chloroasphaltenes include high-temperature packings or heat transfer media. 10、比如，将磺化物质、磺甲基化物质及其衍生物作为钻井泥浆稀料进行测试，效果令人满意，其应用效果可以同商业泥浆稀料相媲美。此外，这些化合物也可用作重油初采的乳化剂。另有迹象表明，这些物质和沥青质的其它类似衍生物，尤其是具有诸如羧基和羟基功能的物质，能够迅速地交换阳离子，并且同沸石形成有力抗衡。羟基和 / 或含氯沥青的衍生物的其他用途包括用作高温包装材料 and 热传递介质。 11. Reactions incorporating nitrogen

and phosphorus into the asphaltenes are particularly significant at a time when the effects on the environment of many materials containing these elements are receiving considerable attention.

Various measures have been and will be taken to release such effects.

11、将氮气和磷混合成沥青的化学反应尤为重要，因为含有这些元素的物质对环境造成的影响正受到严重关注。人们已经且还要采取各种措施来减少这些影响。

12. Nevertheless, the main objective in producing chemicals from petroleum is the formation of a variety of well-defined chemical compounds that are the basis of the petrochemical industry. It must be remembered,

however, that ease of separation of a particular compound from petroleum does not guarantee its use as a petrochemical building

block. Other parameters, particularly the economics of the reaction sequences, including the costs of the reactant equipment, must also

be taken into consideration.

12、不过，从石油生产化学制品的主要目的在于，生产出大量具有明确界定的化合物，以奠定石化工业的基础。但是必须清楚，如果某种化合物能够容易地从石油中分离出来，并不表明它一定就是石化产品的预制品。

其它因素，尤其是生产这些化合物的经济因素，包括反应设备的成本，必须考虑在内。

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