

石油科技英语

于艳华 编著

东北林业大学出版社

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前 言

随着大庆油田国际合作项目的日益增多，越来越多的科技人员需要提高专业英语水平，以便了解国际石油技术和经济的最新进展，成功地参与国际竞争。同时，也为了石油科技人员在学习晋职所需英语材料的同时能够向外扩展相应的知识，特此编写了这部教材。本书主要涵盖了油田开发、石油勘探和石油化工等方面的内容。

本书正文中开列了专业常用术语、词汇等，便于广大读者节省查找工具书的时间。本书的第二部分以巩固为重点，从片段翻译的角度进行测试，以考查读者对知识的掌握情况。

本书也可作为 ESP (English for Specific Purposes/专门用途英语) 教材或参考书使用。

编著者
2007 年 4 月
于大庆师范学院

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Part One Texts

1. Lubricating Oil

This term covers a diverse range of products, specially blended to meet the requirements of every conceivable piece of machinery, be it large or small, and under a variety of conditions of temperature, loading, operating speed and materials of construction. The products thus vary from oils of very low viscosity, such as are required for delicate instruments, to the highly viscous lubricants used on open gears or wire ropes. Typical classifications of lubricating oils include automotive lubricants, diesel-engine lubricants, steam-turbine oils, gear and transmission lubricants, metal-working lubricants (i. e. cutting oils), rolling oils (for metal-working) and compressor oils. These and many other types are dealt with elsewhere in this book, together with the so-called “synthetic lubricants” (for turbine aero-engines) and lubricating greases.

In the present chapter, the emphasis is mainly on lubricating oils for internal combustion engines. For such oils, the starting-point is a series of waxy distillates obtained by distilling, under vacuum, the residue left over from crude oil after motor spirit, kerosene and gas oil have been removed. These basic lubricating-oil cuts are purified, in stages, by solvent processes to remove wax, aromatics and unstable materials which under service conditions could lead to corrosion and deposits of sludge. Not all crude oils are suitable for lubricating oil

production either because the quality of the appropriate cuts is unsatisfactory or because processing difficulties make their use uneconomic.

A lubricating oil is normally classified in terms of its viscosity at some standard temperature, but equally important is its “viscosity index”. This latter is an empirical number giving a measure of the extent to which an oil thins out, i. e., decreases in viscosity as the temperature is raised. A crankcase oil, for example, must have a viscosity low enough to permit ready starting on a cold morning but must not then become so thin, when the engines gets hot, that it loses its ability to lubricate. An oil which meets the above requirement is said to have a high “viscosity index” (VI). This property can be controlled to some extent by refining, but the modern trend towards “multi-grade” oils (e. g., BP Super Visco-static), of extremely high VI, relies on the assistance of certain polymer compounds, which function as VI improvers.

词汇:

automotive 自动的	internal combustion engine 内燃机
be suitable for 适于	kerosene 煤油
compressor oil 压缩机油	lubricants 润滑剂
conceivable 可以想象的	lubricating grease 润滑脂
cutting oils 切削油	motor spirit 车用汽油
diesel engine 柴油机引擎	polymer compounds 聚合物
diverse 多样的	rely on 依靠
empirical 实验的	rolling oil 冷轧润滑油
function as 起……作用	sludge 油泥
gears 调整; 用齿轮连接	starting - point 起点
improver 增进剂	steam - turbine oil 汽轮机油
in stages 分阶段	synthetic lubricants 合成润滑剂

thin out 使稀疏

waxy 含蜡的

viscosity index 黏度指数

wire rope 钢索

viscous 黏性的

transmission lubricant 传动装置润滑剂

metal - working lubricants 金属加工润滑材料

润滑油

润滑油这一术语涉及不同领域的产品，特别是用来满足每一个预料到的机器部件要求的混合型产品，无论机器部件是大是小，也无论温度、负载、运转速度和制造材料多么不同。因此，其产品种类繁多多样，诸如从用在精度仪表上的低黏度润滑油一直到用在开口齿轮或钢丝绳这些物体上的高黏度润滑油。标准的润滑油类型包括机动车润滑油、汽轮机润滑油、齿轮及传动装置润滑油、金属加工（亦即切削油）润滑油、辘子油（用于金属加工）以及压缩机润滑油。本书其他地方还要讨论上述各种类型的润滑油，同时还要讨论所谓的“合成润滑剂”（用于航空涡轮发动机）和润滑脂。

本课着重讨论用于内燃机的润滑油。生产此类润滑油的起点是一系列的含蜡馏出液，它们是通过在真空条件下从原油中已除去了汽油、煤油和粗柴油后的残渣油中蒸馏得到的。用溶剂精制除去石蜡、芳香烃以及一些不稳定物质（这些物质在使用情况下可能会引起腐蚀和淤渣沉积），分阶段将这些主要的润滑油馏分精制。并不是所有的原油都适宜生产润滑油，这或是因为选用馏分的性质不适当，或是因为加工比较困难，使得应用上不经济。

润滑油通常是按某一标准温度下的黏度来分类的。不过，“黏度指数”也是同样重要的。后者是一个经验值，用它来衡量润滑油的稀薄，即黏度随温度升高而下降的程度。譬如，曲轴箱润滑油必须具有足够低的黏度才便于汽车在寒冷的早晨启动。不过，引擎逐渐变热时，润滑油不致变得太稀失去润滑性能。据称，满足上述要求的润滑油就具有一个高的“黏度指数”（VI）。这一性能可以用精致法将它控制到某一范围；不过，当今采用VI特别高的“多极”润滑油的（例如，英国石油公司超级静粘度润滑油）

趋向是凭借某些聚合化合物的帮助，因为这些聚合物能起到“VI 改良剂”的作用。

2. Gas and LPG

During the distillation of a crude oil, considerable volumes of gas (methane, ethane, propane, butanes) may be released, and in the various reforming and cracking processes in a refinery, further quantities of gas are generated as a result of breakdown of heavier fractions. Such gas has a higher calorific value than fuel oil and can therefore be used with advantage as a fuel for refinery process units. However, there are often other demands on refinery gas since the lighter paraffins are readily converted to “synthesis gas” (carbon monoxide and hydrogen) which is a starting point for the manufacture of many chemical products including methanol and ammonia and their derivatives. Ethylene and propylene, if produced, are also valuable raw materials for petroleum chemical production.

Butane is an essential constituent in imparting desirable volatility and anti-knock characteristics to a motor spirit, and it is also a valuable product, per se, as “bottled” gas. Butanes and butenes can be maintained in the liquid state at ambient temperature under quite moderate pressures, and can therefore be marketed in steel containers which can safely be used in the home. Such liquefied petroleum gas (LPG) provides a convenient source of high calorific value fuel for heating and cooking in locations where electricity and town or natural gas are not available, as for example in remote country districts, and also in caravans and small boats. Propane may also be used as LPG, and its lower boilingpoint makes it suitable for this purpose in cold climate. However the main outlet for propane LPG is for industrial

purposes, in particular for metal-cutting, using oxy-propane torches.

The C3 and C4 hydrocarbons also find uses in the refinery itself as feedstock for certain processes manufacturing motor-gasoline components. Propylene and the butanes, for example, may be fed to a catalytic polymerization unit, and isobutene may be reacted in an alkylation unit with a range of olefins.

词汇:

ambient 周围的

ammonia 氨

as a result of 由于

butane 丁烷

calorific value 热值

caravan 旅游居住式挂车

carbon monoxide 一氧化碳

container 容器

liquefied petroleum gas 液化石油气

methanol 甲醇

olefin 烯烃

oxy-propane 氧化丙烷

refinery process unit 炼油厂工艺装置

starting point 起点

synthesis gas 合成气

气体和液化石油气

原油蒸馏时会释放出数量相当可观的石油气（甲烷、乙烷、丙烷、丁烷），而且在炼油的各种重整和裂化过程中，由于重馏分分解的缘故，还会产生大量石油气。这种石油气比燃料油具有更高的热值，因此它有效地用作炼油装置的燃料。不过，由于轻质烷容易转换成“合成气”（一氧化碳和氢气），而这种“合成气”又是制取包括甲醇、氨以及它们衍生物为原料，因此炼油厂生产出来的石油天然气常常用作其他用途。乙烯和丙烯如果生产出来的话，也是石油化工生产上的宝贵原料。

为使车用汽油具备所要求的挥发性能和抗爆性能，丁烷是不可缺少的组成部分；而且，丁烷本身也是一种有价值的产品，它可用作“瓶装”气。在适当的大气压力及常温下，丁烷和丁烯均可保持液体状态，因此它们可以储存在钢制容器中出售，家庭使用十分安全。这种液化石油气，在没有电、没有煤气或天然气供应的地方，比如偏僻的乡村、野外的活动房

和小船上，均可取暖、做饭提供便利的高热值燃料。丙烷也可用作液化石油气，而且因其沸点较低，在高寒地区特别适用。不过，丙烷液化气的主要用途还是在工业上，特别是借助氧、丙烷火焰用于金属切割。

C3, C4 等碳氢化合物在炼油厂里也可用作生产车用汽油组分的某些装置的进料。例如，丙烷和丁烯可用作催化叠合装置的原料，而异丁烷可在烷基化装置里与一系列的烯烃反应。

3. Kerosine

Kerosine, also known as “paraffin” in the UK, is manufactured as a straight-run fraction from crude oil generally in the boiling range 150 ~ 250°C. As such, it covers the same range as aviation turbine kerosine, already mentioned, and in fact at some refineries it has been found convenient to save tankage and make aviation kerosene and lamp kerosene as a common grade. Although the demand for kerosene as an illuminant is diminishing, it finds widespread use in central heating installations and domestic heating stoves, and is also a convenient fuel for incubators, blow-lamps and camping stoves of the “primus” type. Tests for evaluation of kerosene are, therefore, primarily concerned with burning qualities. For example, a standard wick-fed lamp is used to measure the height of the flame which can be attained before smoking commences. This height, in millimeters, is known as the “smoke-point.” An essential difference between “premium” and “regular” grades of kerosene is that the former has a higher smoke-point. To achieve high smoke-point, it is necessary to remove the aromatic compounds, since these, because of their relatively high carbon/hydrogen ratio (compared with paraffinic hydrocarbons) tend to burn with a smoky flame. This is done by a solvent-extraction process, using liquid sulphur dioxide as the solvent.

Such treatment also gives a kerosene of better (lower) "char value." This is a measure of the tendency of a kerosene, on burning, to form carbonaceous deposits which could clog wicks and vaporizers. Such deposits would reduce the efficiency of burning and cause smelly operation, both undesirable features in any domestic or other appliance that is required to run for long periods.

词汇:

aromatic compound 芳族化合物	illuminant 发光
as such 因而	incubation 酝酿
aviation turbine 航空涡轮机	paraffinic hydrocarbon 石蜡烃
blow-lamp 喷灯	tankage 装槽
centralheating 集中供暖	undesirable 不符合要求的
char value 炭渣值	vaporizer 汽化塞; 蒸发器
common grade 普通等级	wick 芯
primus 一种燃烧汽化油的炉子; 首位的	
solvent - extraction process 溶剂提取法	

煤 油

在英国, 煤油通常被称为“石蜡烃”, 它是在 150 ~ 250℃ 的沸点范围内从原油中切割的直馏馏分。煤油的沸点范围, 就其本身而论, 与上文提到的航空透平煤油的范围相同, 而且在有些炼油厂里, 业已发现为节约罐容量把生产的普通品位的航空煤油和灯用煤油分为同一等级储存。虽然煤油用作点灯的需求在开始减少, 但是它在供暖设备及家庭取暖方面有着广泛的用途。而且, 对于保育箱、汽灯以及“便携式”野营煤油炉来说, 它仍不失为一种方便的燃料。因此, 评价煤油的检验标准主要是燃烧性能。例如, 用一种标准的芯灯测量发烟前所达到的火焰高度。众所周知, 这一高度(以毫米计)称为“发烟点”。“高档”与“中档”油的根本差别在于前者比后者的发烟点高。为测量发烟点, 就必须除去芳烃化合物, 因为这些化合物与烷烃化合物相比具有相对高的碳氢比例, 燃烧时容易产生有

烟的火焰。芳烃化合物用以液态二氧化硫为溶剂油的浸提工艺来除掉。这种工艺能生产出较好的即“炭渣值”较低的煤油。这个炭渣值就是衡量煤油在燃烧时形成阻塞灯芯和汽化器的碳质沉积的标准。这类沉积物会降低燃烧功效并产生一种臭味，这两种情况对于家庭或者其他长时间工作的设备来说都是不希望发生的。

4. Extraction

Solvent extraction is the transfer of a solute species from its initial location to a solvent known as the extracting solvent. The pure solute may be a liquid or a solid at the operating temperature but this is unimportant because initially the solute will be located either in a solution or in association with a solid. When the solute is in solution the extraction process is called liquid-liquid extraction, and the extracting solvent must be substantially immiscible with the original solvent. If, on the other hand, the solute forms part of a solid (which need not be “dry”) the process is termed solid-liquid extraction and will be discussed later on.

In liquid-liquid extraction, the extracting solvent must have a suitably selective affinity for the appropriate solute which sometimes occurs in company with materials other than the original solvent. This selectivity is very important because the essence of liquid-liquid extraction is the separation of a particular solute from other materials by means of selective transfer to the extracting solvent. It must be remembered that the solute extracted is not always the most valuable product of the separation process; the aim might be to purify the original solvent by removal of an unwanted solute, or perhaps to remove one of two solutes from the original solution.

The technique of separation by solvent extraction is often

attractive in circumstances where distillation is unsuitable. If, for example, the solute is heat sensitive, or present in very low concentration, then liquid-liquid extraction may be appropriate.

In solid-liquid extraction, one constituent of a solid is transferred to an extracting solvent and is thereby separated from the rest of the solid. The extracted material is not necessarily a solid but may be present in the bulk solid in a liquid form. Some solids even have an intrinsic solvent content which becomes evident during the subdivision process. Sugar beet, for example, is extracted with water and is itself about 30% water by weight.

Since a solid does not flow as do the fluids in liquid-liquid extraction, the equipment for solid-liquid extraction is different from that for liquid-liquid equipment.

词汇:

affinity 吸引力

extracting solvent 萃取溶剂

immiscible 非混相的

intrinsic 内在的

later on 后来

selectivity 选择

solvent extraction 溶剂萃取

subdivision 分支

sugar beet 糖用甜菜

unsuitable 不合适的

unwanted 不需要的

萃 取

溶剂萃取是将溶质类物质从其最初所在的场地传递到某一溶剂中去。这种溶剂通称为萃取用溶剂。在操作温度下,纯溶质可以是液体,也可以是固体,但是这一点并非重要,因为溶质最初不是处于溶液之中,便是和固体混合在一起。当溶质处于溶液之中,则这种萃取过程称为液-液萃取。萃取用溶剂在本质上不应该和原溶剂(指与要萃取的溶质原先溶解在一起的溶剂——译者注)相溶混。另一方面,如果溶质形成固体一部分(不一

定是“干”的), 则这个过程称为固—液萃取, 这将在以后予以讨论。

在液—液萃取中, 萃取用溶剂必须对某种合适的溶质具有适当的选择亲和性, 因为这种溶质有时和除了原溶剂以外的其他物质在一起。这种选择性之所以非常重要, 是因为液—液萃取的实质就是通过选择性的传递, 将特定的溶质从其他物质中分离出去, 并传递到萃取用的溶剂中去。必须记住, 被萃取的溶质并不总是分离过程中的最有价值的产品; 萃取目的也许是去掉不需要的溶质, 从而提纯原溶剂, 或者是从原溶液中除去两种溶质之一。

在蒸馏不适用的场合下, 通过溶剂进行的分离技术常常很有吸引力。例如, 如果溶质对热敏感或在溶液内浓度很低, 则液—液萃取便很适用。

在固—液萃取中, 固体中有一个组分被传递到萃取用溶剂中去, 从而和固体剩余部分分离。被萃取的物质并不一定是固体, 但也可以是以液体形式存在于块状固体之中。某些固体甚至有内部的溶剂含量, 这种含量在固体进一步细分时变得十分明显。例如糖甜菜, 用水萃取后, 按重量计它本身含有约 30% 的水。

由于固体不能像液—液萃取中的流体那样流动, 因此, 固—液萃取用的设备也不同于液—液萃取用的设备。

5. Crystallization

Crystallization from liquid solution is important industrially because of the variety of materials that are marketed in the crystalline form. Its wide use is based on the fact that a crystal formed from an impure solution is itself pure (unless mixed crystals occur) and that crystallization affords a practical method of obtaining pure chemical substances in a satisfactory condition for package and storing.

It is clear that good yield and high purity are important objectives in operating a crystallization process, but these two factors are not the only ones to be considered. The appearance and size range of a crystalline products are also significant. It is especially necessary that