



# Translation of the Titles of Academic Papers on Petroleum in English and Chinese

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## Abstract

With the rapid development of our country's petroleum industry, especially in the aspects of foreign cooperation and international operation, a large number of articles and documents on petroleum have been produced accordingly. The translation of scientific texts on petroleum serves as a bridge for communication between our country and the world. What's more, the quality of translation is of great practical significance to our country's petroleum industry. Therefore, this paper takes the titles of academic papers on petroleum as research objects and uses two methods of literature analysis and comparative research to conduct an analysis of scientific and technological texts and the titles of academic papers on petroleum from the aspects of the structure of vocabulary and syntax. Finally, the present paper summarizes and puts forward appropriate translation principles and strategies, in order to provide useful experience for the practice of English translation of scientific and technological materials.

## Subject Areas

Linguistics, Literature

## Keywords

English for Science and Technology, Translation of Titles, Academic Papers

## 1. Introduction

Petroleum English is a kind of English for professional use that has emerged with the development of science and technology. It is an essential branch of English for science and technology. Domestic and foreign academic circles are relatively active in the translation research of petroleum scientific and technological texts, and a certain number of published articles have accumulated, but there are not many translation researches on the titles of academic papers on petroleum.

As the eye-catching “signboard” of the literature, a title is a way for the literature to convey information and attract readers successfully. Whether readers are interested in this article first depends on the title of the article. The translation of title is more related to the effectiveness of document dissemination. Based on the research results of previous experts and scholars at home and abroad, this paper conducts further research on the titles of academic papers on petroleum in Chinese and English.

## 2. Literature Review

In China, the research on translation of scientific and technological texts originated early with many achievements. The climax of translation in the late Ming and early Qing dynasties was mainly scientific and technological translation. Xu Guangqi and Italian Matteo Ricci co-translated Euclid’s “Elements of Geometry” and “Measurement Law” and other scientific and technological works. When Translation Newsletter was founded and began to publish papers on sci-tech translation studies in 1950, Chinese sci-tech translation studies have gone through more than 70 years.

Fang Mengzhi divided the sci-tech translation studies from 1950 to 1999 into three stages: Stage one (from 1950 to 1979) was the “groping and pause” period, focusing on the translation of sci-tech terms and vocabulary. Stage two (from 1980 to 1989) was the “introduction and summary” period, focusing on the summary and refinement of translation skills. Stage three (from 1989 to 1999) was the period of “contention and development”, focusing on the functional purpose and translation strategies of sci-tech translation [1].

Based on the available literatures, Sheng Zengtang discussed petrochemical technical terminology, including the characteristics and translation skills of petrochemical technical terms [2]. Scholars who also studied the translation of titles include Zhou Lingshun, Zhang Xinmin, Zhou Yaxiang, Fang Yu, and so on. They mainly conducted research on the skills and principles of translation of titles. Cui Weihui and Cui Weili take petroleum English as an example to study the characteristics and translation strategies of EST [3].

In addition, Yu Lu, Zhang Yangyang, Nong Xueming, Yang Xichao, and Wang Ziqi have studied the translation of sci-tech text from the perspective of Skopos theory. Liu Hongmei, He Sanning, He Jing, and He Min have studied the translation of scientific and technological texts from the perspective of aesthetics. Ma Xi, Su Xiaoxia, and Wang Haili have studied the translation of Scientific and technological texts from the perspective of functional translation theory.

In previous research on the translation of scientific and technological texts, scholars have focused on research from various theoretical perspectives, such as Skopos theory. In the past, some scholars have studied petroleum English, and some have studied the translation of the titles of academic papers. However, few scholars have combined two aspects for research. Moreover, most of the research objects of scholars who study the translation of titles are papers on computers and

medicine.

At present, few scholars have carried out in-depth research on the translation of the titles of academic papers on petroleum in Chinese and English. It's in a position of being ignored. However, the study of the translation of the titles of academic papers on petroleum is particularly important. So, the present paper focuses on the study of the translation of the titles of academic papers on petroleum into English and Chinese.

### **3. Introduction of English for Science and Technology (EST)**

EST is a kind of English used by science and technology workers in scientific and technological research. According to the text type theory of Newmark, the scientific text belongs to informational text. The translation of scientific texts is also an important way for Chinese researchers to have a good command of the development of cutting-edge foreign technologies.

#### **3.1. The Differences between General English and EST in Vocabulary**

##### **3.1.1. The Use of Abbreviations**

Abbreviations, a way that can achieve the most efficient communication through the simplest form of language. Abbreviations are easy to remember, so they are more widely used in Scientific English than in general English. There are three forms of abbreviations in Scientific English:

- Shorten parts of a word to form a new word, such as gas (gasoline).
- Combine the first letters of each word in a phrase together to form a new word, an acronym, such as LPG (liquefied petroleum gas).
- Use letters from two words to form new words, such as stagflation (stagnation + inflation).

##### **3.1.2. The Sources of Vocabularies**

According to Oscar E. Nybaken, an American expert in EST, about 46% of the 10,000 words in general English are derived from Latin and 7.2% from Greek. This proportion is even higher in EST vocabularies because it is more professional. The second source of the vocabulary in EST is other subjects and English. When English for Science and Technology first developed into a new subject, there were few words belonging to this subject. Therefore, EST borrows some general words from other disciplines and gives them new meanings. Liu Miqing also stated that a large number of technical English vocabulary often uses word formation to expand new words, and the number and speed of expansion far exceed other styles of English [4].

##### **3.1.3. The Use of Terminology**

Terminology is a collection of appellations used to represent concepts in a specific subject area. Han Shuqin introduced the lexical and syntactic features of English for petroleum technology in great detail and mentioned that lexical features are

professional, concise, abstract, figurative and interdisciplinary [5]. A very distinctive feature of the vocabulary of EST is that it usually uses a large number of technical terms in the field. The terminologies in the field of petroleum include not only the terms specifically used in the petroleum field, but also the terms that evolved from the words in general English.

## **3.2. The Differences between General English and EST in Syntax**

### **3.2.1. The Use of Simple Present Tense**

The truth, such as definitions, theorems, figures or formulas of science explained in EST, is timeless, which is reflected by the present tense. There are also cases introducing researches carried out in the past which need past tense or present perfect to display the relation of past research with the present study. To sum up, in normal circumstances, only these three tenses are often used in scientific English texts. However, in general English, different tenses are used in different sentences and situations.

### **3.2.2. The Use of Nominalization**

Halliday pointed out that grammatical metaphors characterize all adult texts, and that nominalization is the most powerful way to create grammatical metaphors [6]. Nominal structure uses concise words, compact structure, objective meaning, and large information capacity, which can save too many subject-predicate structures in many cases. Liu Miqing said that the main task of scientific and technological articles is to narrate facts, so the expression should be relatively concise, especially the simplification of language structure [4]. However, in general English, there are lots of sentences that contain subject and predicate.

## **4. Introduction of the Titles of Academic Papers**

### **4.1. The Role of Titles in Academic Papers**

A good title is half the battle for a paper. In summary, one of the roles of the title is to attract target readers' attention. As we all know, a good title could briefly and clearly summarize the main content of the whole paper. What's more, the title of a paper can also help target readers understand the paper at a glance. That is, let readers have a clear understanding of the structure and main content of the paper.

### **4.2. Principles for the Formulation of Academic Paper Titles**

#### **4.2.1. Short and Concise**

The style of academic papers is more formal, so they have higher requirements in terms of brevity. Generally speaking, the number of words in a title is limited. The title should generally not exceed twenty words. If the title of a paper cannot be simplified, we can add subtitles.

#### **4.2.2. Complete and Accurate**

The four elements of the title are research objects, research purpose, research scope and research method. Generally speaking, the title needs to contain these four el-

ements, so as to make the readers' impression clear.

#### 4.2.3. New and Unique

The title has to be new and unique enough to catch the reader's attention. This is not to say that all elements have to be new and unique, at least one element is new. For example, many scholars use translation theory to study the subtitles of a movie, and then you also use the same translation theory, but you study a newly released movie, which is also called novelty. Although the theory is ordinary, the film studied is new, which will increase the desire of the reader to continue reading.

## 5. Comparison of the Titles in English and Chinese

### 5.1. Titles of Academic Papers on Petroleum in English and Chinese

A keyword search was conducted using academic databases such as Web of Science, Scopus, CNKI, among others, as well as search engines like Google Scholar. Based on predefined criteria, a substantial pool of candidate papers was initially screened. Further refinement involved reading the abstracts of these candidates to exclude those with low relevance to the topic. To ensure the academic merit and representativeness of the selected papers, experts or peers within the field were invited to conduct a review. Following the outcomes of the initial screening and peer review, 30 papers were ultimately identified as the research sample. This number was strategically chosen to balance sufficient diversity with the required depth of analysis.

There are 15 titles in English from three journals: *Petroleum Science and Technology*, *SPE Transactions*, and *Petroleum Science and Engineering*. Also included are 15 Chinese paper titles from four different journals: 《中国炼油与石油化工》 (China Petroleum Processing & Petrochemical Technology); 《石油与天然气地质》 (Oil & Gas Geology); 《石油勘探与开发》 (Petroleum Exploration & Development) 和 《石油学报》 (ACTA PETROLEI SINICA). The title is as follows.

- 1) Improve crude oil recovery through geochemical methods—take the Longwangmiao formation in Moxi area of Sichuan Basin, China, as an example.
- 2) Development of the Petroleum Resource Specifications and Guidelines PRSG—A Petroleum Classification System for the Energy Transition.
- 3) Transforming Traditional Chinese-Taught Petroleum Engineering Courses into English-Taught Petroleum Engineering Courses to Meet ABET Standard.
- 4) Real-Time Well-Integrity Monitoring Using Fiber-Optic Distributed Acoustic Sensing.
- 5) Developing Capability for a Continuous Improvement Culture in PDO.
- 6) Creating Opportunities for Successful Artificial Intelligence Applications in the Upstream Petroleum Industry.
- 7) Influence of Representative Models in the Expected Value of Information Applied to Petroleum Fields Development.
- 8) Meeting the Strategy of Onshore Petroleum Exploration Based on Statistical Analysis of Operating Cost and Commercial Reserves in Indonesia.

- 9) Petroleum system analysis of the Paleozoic series in the Fars Platform of Iran.
- 10) Better opportunities created for investors by evolution of petroleum contracts in Iraq under the background of the recovery of oil prices.
- 11) UAV-based remote sensing for the petroleum industry and environmental monitoring: State-of-the-art and perspectives.
- 12) Deepest oil in Asia: Characteristics of petroleum system in the Tarim basin, China.
- 13) A novel method to determine total petroleum hydrocarbon (TPH) and water contents in reservoir drill cuttings.
- 14) The pore-scale mechanisms of surfactant-assisted spontaneous and forced imbibition in water-wet tight oil reservoirs.
- 15) Brent and WTI oil prices volatility during major crises and COVID-19.
  - a) 生物炭负载纳米零价铁去除水中石油污染物
  - b) 石油化工中的结晶
  - c) 生产超低硫柴油 RTS 技术的工艺优化
  - d) 一种新的高含水原油粘壁温度预测方法
  - e) 长链醇的添加对航空煤油宏观喷雾特性的影响
  - f) 长庆原油及其常减压渣油中氮化物的组成分析
  - g) 深层油气藏成因类型及其特征
  - h) 中国沉积盆地油气立体综合勘探论
  - i) 利用混合模型 CRBM-PSO-XGBoost 识别致密砂岩储层岩性
  - g) 石油与天然气在中国一次能源中的地位
  - k) 盆地沉积动力学：研究现状与未来发展趋势
  - l) 中国迎来页岩油气革命了吗
  - m) 气体钻井随钻安全风险智能识别方法
  - n) 石油分子重构技术的研究进展
  - o) 三种类型石油酸的腐蚀性以及相互影响

## 5.2. The Similarities between the Titles in English and Chinese

### 5.2.1. Lexical Similarities

#### 1) The use of abbreviations

After comparison, the present paper finds that the titles of the academic papers on petroleum in English and Chinese are used to using abbreviations. Among the titles in English and Chinese given above, seven titles use abbreviations. For example, the “PRSG” in example (2) means pseudo-random sequence generator. The “PDO” in example (5) means Petroleum Development Oman. The “TPH” in example (13) means total petroleum hydrocarbon. The “UAV” in example (11) means unmanned aerial vehicle. The “WTI” in example (15) means West Texas Intermediate.

#### 2) The use of terminology

Terminology refers to a special appellation for some specific things in a specific field. As a paper in a professional field, its title naturally uses terminologies. This not only allows professionals to understand the main content of the paper at a glance, but also attracts the attention of non-professionals.

### 5.2.2. Syntactic Similarities

In the choice of sentence types, both Chinese and English titles tend to use declarative sentences. This is because scientific and technological texts are characterized by scientificity and rigor. Among the titles given, only one Chinese title is interrogative sentences, and all the others are declarative sentences.

## 5.3. The Differences between the Titles in English and Chinese

### 5.3.1. Lexical Differences

#### 1) The Use of Compound Words

Compound words, whose most obvious feature is that they are connected by hyphens, are generally used in the titles of the academic papers on petroleum in English. There are even three compound words used in one title: pore-scale, surfactant-assisted and water-wet. However, the titles of the academic papers on petroleum in Chinese hardly use compound words.

#### 2) The Use of Part of Speech

The titles in English tend to use nouns. But the titles in Chinese prefer verbs. From the perspective of linguistic morphological classification, as an inflectional language, the use of verbs in English is strictly restricted by the rules of morphological changes. There is often only one predicate verb in a sentence, or several verbs are used as predicates in parallel. Therefore, EST tends to use nouns. However, Chinese is an isolated language and belongs to an analytical language. Verbs have no morphological changes, so they are often used in Chinese.

### 5.3.2. Syntactic Differences

#### 1) Differences in voice

The titles of papers on petroleum in English are mostly in passive voice. On the contrary, the titles of papers on petroleum in Chinese mostly use active voice. Generally speaking, the form of Chinese titles is the simplest subject-predicate-object sentence.

#### 2) Differences in the length of the sentence

English titles often use long, complex sentences with various subordinate clauses, enriching expressive power and adding depth, clarity, and precision. These structures capture readers' attention, drawing them into engaging, memorable narratives or discussions. On the contrary, Chinese titles use short sentences. In the examples given, the shortest Chinese title is example (2). It has only eight characters: 石油化工中的结晶 (Crystallization Process in Petrochemical Industry). The translation of this title also consists of only five words. However, in example (1) in English titles, the words of the paper titles are up to twenty-one.

## 6. Principles and Strategies for Translation of Titles

### 6.1. The Strategies or Skills for Translation of the Chinese Titles

#### 6.1.1. Verbal Norminization

Nominalization is a general grammatical means in languages. There are many definitions of nominalization, of which the most influential are the following two:

The functional grammar school Halliday pointed out that nominalization is the primary means of grammatical metaphor. In the process of nominalization, verbs (processes) and adjectives (features) are metaphorically transformed into nouns, and have the function of “things” in the nominal structure.

From the perspective of linguistic morphological classification, as an inflectional language, the use of verbs in English is strictly restricted by the rules of morphological changes. There is often only one predicate verb in a sentence, or several verbs are used as predicates in parallel. Therefore, English often uses nominalization structures. However, Chinese is an isolated language, which belongs to an analytical language. There is no morphological change in verbs. Chinese verbs have great advantages in Chinese sentences and can act as various components in sentences. These differences between English and Chinese determine the necessity of converting verbs into nouns in English translation of scientific and technical texts.

Example 1: 利用混合模型 CRBM-PSO-XGBoost 识别致密砂岩储层岩性

Version: Lithology identification in tight sandstone reservoirs based on CRBM-PSO-XGBoost.

We can clearly see that the verb “识别” in the original text is translated as a noun “identification” in the translation. “识别……岩性” is translated as “Lithology identification”.

### 6.1.2. Omission

No matter which method we use in the translation process, we must ensure that the translation is faithful to the original text. On the basis of a thorough understanding of the original text, the translator should reproduce the meaning of the original text in the translation through appropriate amplifications and omissions, so that readers can fully understand the original text and make the text more distinctive.

Example 2: 中国沉积盆地油气立体综合勘探论

Version: Integrated 3D hydrocarbon exploration in sedimentary basins of China.

By comparison, we can find that this example uses omission, and the “论” in the original text is omitted during translation. When we Chinese write papers, we like to add words such as “Preliminary study of, Superficial view of” in the title. When we translate them into English, we should omit these words as appropriate. We use these words to express a humble attitude, which is the tradition of our Chinese nation. But it does not mean that our research on the paper is really not deep enough. Therefore, we should omit this kind of word in the translation process so as not to create an illusion for foreign readers.

## 6.2. The Principles for Translation of the Chinese Titles

Nord believes that the primary function of informational texts is to inform readers about real-world substances and phenomena, while the choice of language and style is secondary [7]. Therefore, when we translate Chinese titles into English

titles, the principle we should abide by is the principle of faithfulness. We should be faithful to the original text when translating, and express the meaning of the original text to the maximum extent.

Example 3: 利用混合模型 CRBM-PSO-XG Boost 识别致密砂岩储层岩性

Version: Lithology identification in tight sandstone reservoirs based on CRBM-PSO-XG Boost.

This is a title with a modifier-head structure. The qualified word of this title is “识别致密砂岩储层岩性”. It has a verb-object relationship with other words. In order to clearly reflect this logical relationship, the translation adopts “based”.

## 7. Conclusions

The present paper takes thirty titles of academic papers on petroleum in English and Chinese as research objects. The method used is literature analysis and comparative research. This paper mainly compares and studies Chinese and English titles from the levels of vocabulary and syntax. The study finds that the titles of academic papers on petroleum have their own characteristics in terms of vocabulary and syntax. In terms of vocabulary, the titles of academic papers in English often use acronyms, nouns and technical terms. However, the titles in Chinese often use verbs. In terms of syntax, the titles of academic papers in English tend to use compound sentences, nominal structures, and passive voice. However, the titles in Chinese often use short sentences and active voice. What’s more, the present paper summarizes the strategies and skills for the translation of Chinese titles, which include verbal norminization and omission.

Due to the limited research objectives and my academic level, this study has many shortcomings. For example, the summary of translation strategies is not comprehensive enough. Clearly, there are more and better translation strategies to be discovered. In the future, the scope of research objects can be further expanded. It is also feasible to study abstracts of academic papers on petroleum in English and Chinese. Perhaps, statistical charts and related data can be added to make the research results clearer.

## Conflicts of Interest

The authors declare no conflicts of interest.

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