CASTED

中美清洁能源技术转移与知识产权问题

China-US Clean Energy Technology Transfer and IP

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1. Case:中国的一项清洁能源技术转移到美国

Major Break Through in Science and Technology "Go Out"

Hallmark Event in China and US Science and Technology Cooperation

——East China University of Science and Technology Signs 15.1 Million Dollar Contract with US Over Permit To Use Coal Gasification Technology Patent

科技“走出去”的重大突破　中美科技合作的标志性事件

——华东理工大学和山东兖矿国拓科技工程有限公司与美国Valero公司签订1510万美元煤气化技术专利实施许可

The research and industrialization of coal gasification technology by East China University of Science and Technology (ECUST)

华东理工大学和兖矿国拓煤气化技术的研究开发与产业化

ECUST has been researching and developing multinozzle water-coal-slurry gasification technology for over 20 years, and has proprietary intellectual property rights over the technology. The whole R&D programme has been carried out under national science and technology plan. The multinozzle contraposition water-coal-slurry gasification technology has been through long-term industrial operations, and has proven to be a cutting-edge technology in terms of technology indicators, stability as well as dependability.

多喷嘴水煤浆气化技术是华东理工大学和兖矿国拓经过20余年的研发和积累形成的具有自主知识产权的技术。该技术的研发完全是在国家科技计划的支持下完成的 。多喷嘴对置式水煤浆气化技术已经经受了长周期工业运行考验，在工艺指标、稳定性和可靠性和稳定性等各方面都表现出了先进性。因此，国内众多煤气化项目纷纷选择该技术。近两年来，在与国际技术的公开竞争中，多喷嘴气化技术屡屡获胜。

Going Out 走出去

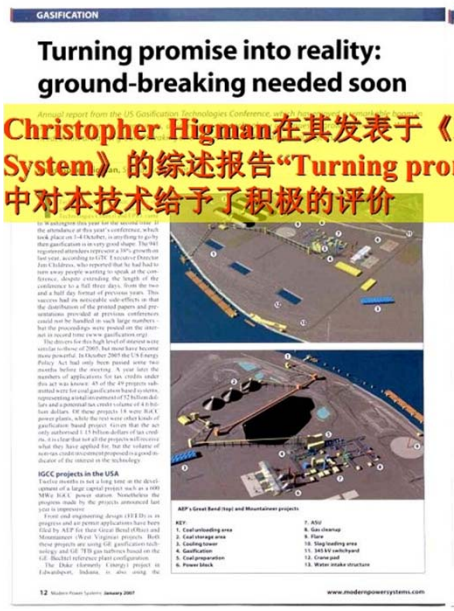
With this technology, ECUST competes on the same level with GE and Shell and finally won the contract with Valero, which became a hallmark event in Technology Going Out. It has blazed a trail for Chinese institutions to export energy and chemical technologies to developed countries. It also marks the transition of China's international science and technology "Bringing In" to the phase of both "Bringing In" and "Going Out".

该项技术已成为与GE、Shell等同台竞争的技术，华东理工大学、兖矿国拓与Valero公司签订合同是该技术走出国门的历史性标志。它开启了中国向发达国家出口能源与化工技术的先河。这也表明我国从“引进来”走向“引进来”与“走出去”并重的国际科技合作新的历史阶段已经到来。

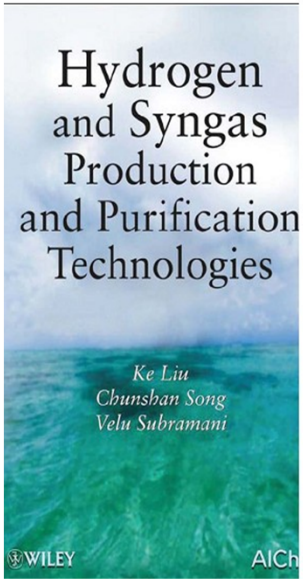
走出国门

首次向美国出口成套大型化工技术

2008年7月31日与北美最大的炼油企业Valero能源公司(世界500强第43位)签订了技术实施许可合同（费用超过1亿元人民币），建设5套用于制氢的单炉日处理2500吨石油焦的多喷嘴对置气化装置。



Christopher Higman在其发表于《Modern Power System》的综述报告“Turning promise into reality”中对本技术给予了积极的评价



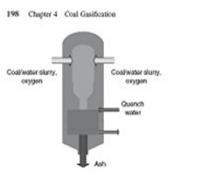
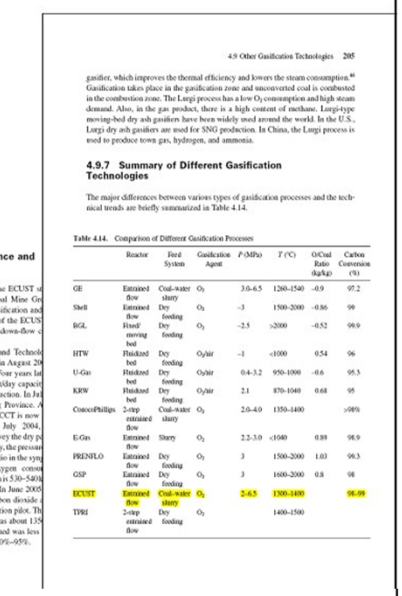


Figure 4.23. Schematic of an ECUST gasifier.

4.9.2 East China University of Science and Technology (ECUST) Gasifier

The Institute of Clean Coal Technology (ICCT) at the ECUST s
coal gasification technology with the YanKuang Coal Mine Gr
1990s.[41] ECUST incorporates both CWS feeding gasification and
feeding technology. Figure 4.23 shows a schematic of the ECUS
gasifier consists of four opposed-jet nozzles, with a down-flow c
slagging equipment.

With the support of the Ministry of Science and Technol
22/day CWS pilot gasifier was successfully started in August 20
Chemical Fertilizer Plant in the Shandong province. Four years lat
mercialized four-opposed-jet CWS gasifier with 750/day capacit
at Huaiu Hengsheng Chemical Co. for ammonia production. In Ja
day gasifier went into operation in Lunan, Shandong Province. A
ceeded in developing CWS gasification technology, ICCT is now
feed pulverized coal gasification technology. In July 2004,
demonstrated a pulverized coal gasifier with N_2 to convey the dry p
gasifier's capacity is between 15 and 45/t of coal per day, the pressu
and the temperature is 1300–1400°C. The CO + H_2 ratio in the syn
the carbon conversion rate is 98%–99%, the oxygen consu
320 Nm^3 O_2/1000 Nm^3 (CO + H_2), the coal consumption is 530–540/
(CO + H_2), and the cold gas efficiency is over 84%. In June 2005
performance obtained by replacing nitrogen with carbon dioxide
coal carrier was studied at the pulverized coal gasification pilot. Th
sure was 1.0–3.0 MPa and the working temperature was about 135
the dry mole fraction of nitrogen in the syngas obtained was less
dry mole fraction of (CO + H_2) was in the range of 90%–95%.



5.3.9 ICCT OMB process

The Institute of Clean Coal Technology (ICCT) at the East China University of Science and Technology in Shanghai began work on developing its own gasification process in 1995. The initial designs were based on a coal-water slurry feed using opposed multiple burners (OMB) in a refractory lined vessel (Figure 5.28). A 22 t/d pilot plant was operated successfully in 2000. A first 750 t/d commercial-scale gasifier operating at 65 bar went on stream at Dezhou in late 2004. Two further units of 1150 t/d were started up in the Yankuang plant near Lunan in 2005. A carbon conversion rate of over 98% is reported for both these plants. ICCT is working on modified designs using dry feed (with N_2 and CO_2 as carrier gas), as well as a water-cooled membrane wall reactor design (Yu *et al.*, 2005; Zhou *et al.*, 2006). A further seven plants have been licensed in 2007 (Yu *et al.*, 2007).

The slurry preparation and feed is conventional, using a horizontal ball mill and membrane piston pump. The unique feature of the OMB reactor is the use of four side-mounted burners in a down-flow reactor, to which the high carbon conversion is attributed. The reactor is a quench design with special internals to reduce water carry over. The slag collects in the water bath of the quench and is discharged via a lock-hopper (see Figure 5.28). The gas leaves the quench water saturated at a temperature of about

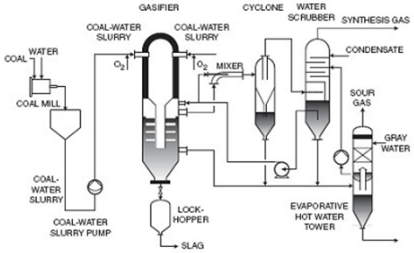
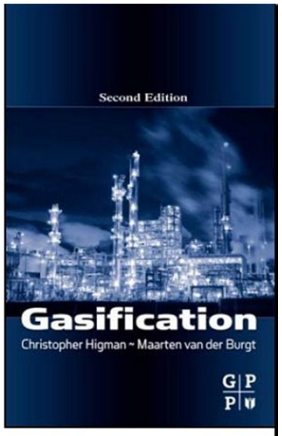


Figure 5.28 The ICCT Opposed Multiple Burner basifier (adapted from Zhou *et al.*, 2006).



2. 技术转移对中美是互利互惠的

Currently the international technology transfer interpenetrating with multiple international cooperation in science & technology and international cooperation in economy and science & technology has become the useful tool for effectively utilizing the global resources in science and technology, enhancing the capacity for innovation, and achieving leaps in key areas.

目前，国际技术转移与多种形式的国际科技合作，与国际经济技术合作日趋相互渗透，已经成为有效利用全球科技资源, 提高各国创新能力, 解决气候变化、能源安全等全球性问题的有效手段。

国家支持技术转移

- 技术转移是中美合作应对全球化挑战的基础

✓ 全球气候变暖
✓ 粮食安全
✓ 能源短缺
✓ 环境污染
✓ ……

加强合作
优势互补
共同应对
形成合力

成功的典范

欧洲国家与中国政府成立的第一个国家级技术转移中心

3. 企业是技术转移和保护知识产权的主体

- **Enterprises is the principal part of Research and Development Investment, the main part of technology innovation, the main body of innovation achievement utilization. Based on that, departments of government makes further effort to encourage college and universities and research institutes to form closer innovation new partnerships with enterprises. And thus, the formation of a technology innovation system that combines the industry, the universities, and the research institutions with enterprises as initiators and market as guidance.**

企业是研究开发投入的主体、技术创新活动的主体、创新成果应用的主体，在此基础上推动大学、科研机构与企业建立多种形式创新伙伴关系，从而形成以企业为主体、市场为导向、产学研结合的技术创新体系。因此，企业也是技术转移和保护知识产权的主体。

4. 中国保护知识产权的环境越来越好

- **Trying vigorously to build a credible, comprehensive and harmonious academic environment that supports independent research and exploration, protects intellectual property, promotes academic democracy, and encourages academic competition so that all innovative ideas are respected, all innovative acts are backed up, all innovative capabilities are developed, and all innovative achievements are awarded.**

积极营造诚信、宽松、和谐的学术环境，鼓励自主探索，保护知识产权，发扬学术民主，提倡学术争鸣，使一切创新想法得到尊重、一切创新举措得到支持、一切创新才能得到发挥、一切创新成果得到肯定。

- **National Treatment for Foreign Enterprises, and A Level Playing Field** 对中外企业一视同仁，提供公平的竞争环境

The Chinese government provides national treatment to all foreign enterprises that are registered legally in China. In Chinese, "Native Enterprises" not only mean domestically funded enterprises but also Sino-foreign joint ventures and wholly foreign owned enterprises. The Chinese laws protects all three kinds of enterprises, and the Chinese governments give support and preferential policies to all three kinds. This is what we have been emphasizing, the "national treatment", and the "fair shake". On top of all that, the central government and the local government give incentives for transnational enterprises to establish R&D centers in China.

According to statistics, by 2009, foreign new- and high-tech enterprises in China have established 3,300 R&D institutes that employ more than 312,000 people. The world top 500 has established 340 R&D institutes in China.

中国政府将所有在中国境内经过法律注册的外资企业视同于本国企业。中国语境中的“本国企业”实际上是包括内资企业、中外合资企业和外资独资企业的大概念。中国的法律对所有这三类企业都提供保护，中国的扶持和优惠政策对所有这三类企业都给予支持，这就是我们所一直强调，也一直在坚持的所谓“国民待遇”和“一视同仁”。中国的中央和地方政府还特别鼓励跨国公司在华设立研发中心。

据统计，到2009年在中国的外资高新技术企业共设立了3300家研发机构，所雇佣的科技人员达到31.2万人。世界500强在华设立的研发机构已达340多家。

整合中美创新资源，搭建企业技术转移的平台

创新科技国际联盟是由国内外产学研机构组成的创新网络，致力于搭建一个集科技政策、研发、产业、金融与投资的合作平台。

创新科技国际联盟的宗旨是搭建官、产、学、研、资、用结合的平台，开展技术合作，交流创新经验，促进技术转移，推动创业投资，加速科技成果转化，联合培养人才，加强人员的交流。整体推进国家创新体系建设，为建设创新型国家做出贡献。

技术转移

整合中美创新资源，搭建企业技术转移的平台

CASTED

谢谢大家 ！

Thanks！

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