

HANKOR CHINA

附件七

国家级新材料重点实验室

国家级新材料研发中心

国家级新材料生产基地



INDEX

核心要素：安全& 环保

P3

公司简介

P6

专利介绍

P8

科学家团队

P10

产品介绍

P17

竞争力-优势

P27

研发方向

P30

HANKOR 中国架构

P33

市场及经济效益

P36

发展规划

P38



沉痛教训



2009-2-09 北京央视大火

2010-11-15上海静安大火



面对火灾，我们应该做什么？

- ✓ 保护生命、财产的安全，防火是基础要求；
- ✓ 高温或明火的场所材料需符合灭火、耐火等规定要求；
- ✓ 制造、应用及后置处理，安全环保为第一要素！





HANKOR

- ✓ 致力于新型防火材料的研发
- ✓ 国际著名科学家团队，**13**项核心国际专利
- ✓ 获得美国商务部、能源部的新型材料认可
- ✓ 产品高效，便利
- ✓ 生产及使用均绿色环保



HANKOR公司成立于2002年， 致力于气凝胶产品的研发、应用及工业制造

History

- Year 2002** • A core business company for the " Mine Waste utilization and development of advanced construction materials" (2002. 7. 29)
- Year 2004** • Authentication for the development and commercialization of preservatives for the de-sulphuring equipments for Yeosu, South East Thermal Power Plant.
- Year 2007** • Discontinue of company business due to the amendments of legislation (Mines Development Act)
- Year 2011** • The second phase started with the attempts for the technological development and application of silica Aerogel
 - Approval for the establishment of research institute from the Ministry of Knowledge and Economy (2011.10.23)
 - Selected as Knowledge Economy Corporate Strategy Development Institute by the Korea government (support of 1 billion won for 2 years)
- Year 2012** • Development of outstanding Organic/ Inorganic Aerogel coatings technology
 - Development of 'Aerogel inserted Fibers' technology (Scope of application: Insulation, Sound Absorption, warm Clothes, Sleeping bag, etc)
 - Development and operation of the world's largest (single batch) Silica Aerogel production facility

HANKOR公司

拥有1项美国专利，1项中国专利，11项韩国专利

“Patents for core technology”

核心专利：

Registered Domestic/ International Aerogel and
Application Patents ”

Patent No.	Filing date	Registered date	Title of invention	
8,137,651	Sep. 23, 2012	Mar. 21, 2012	Method for Preparing Hydrophobic Surface Aerogel And Hydrophobic Surface Aerogel Therefrom	USA
ZL200880010 090.5	Sep.27, 2009	Jan.04, 2012	Method for Preparing Hydrophobic Surface Aerogel And Hydrophobic Surface Aerogel Therefrom	China
10084885600 00	Mar.27, 2007	July.28, 2008	Method for Preparing Hydrophobic Surface Aerogel And Hydrophobic Surface Aerogel Therefrom	Korea
10092478100 00	Sep.19, 2007	Oct.27, 2009	Method for Preparing Surface-Modified Transparent Bead Type Aerogel and Aerogel Prepared Therefrom	Korea
10092478200 00	Sep.19, 2007	Oct.27, 2009	Method for Preparing Surface-Modified Transparent Bead Type Aerogel and Aerogel Prepared Therefrom	Korea
10103894900 00	May 09, 2008	May 30, 2011	Process for Synthesizing Nanosize Silica Particles	Korea

核心专利:

Competitiveness

Patent No.	Filing date	Registered date	Title of invention	
10110663500 00	April 23, 2009	Jan.10, 2012	MANUFACTURING METHOD OF POLYPROPYLENE WITH SILICA AEROGEL POWDER AS FILLER AND POLYPROPYLENE PRODUCT	Korea
10102518100 00	Feb.10, 2009	Mar.21, 2011	MANUFACTURING METHOD OF INSULATING AND FIREPROOFING PAPERING PASTE WITH SILICA AEROGEL POWDER	Korea
10082429100 00	Feb.13, 2007	April 16, 2008	Method for Preparing Surface-Modified Nano-sized Silica	Korea
-	Mar.15, 2007	-	Method for Preparing Surface-Modified Aerogel	Korea
10112937500 00	May 04, 2009	Feb.29, 2012	Porous Ceramic Prepared From Sodium Silicate and Aerogel and A Method for Preparing Thereof	Korea
10055440300 00	Dec.16, 2002	Feb.15, 2006	Recovery of V, W, and Ti components from waste de-Noxcatalyst	Korea
10084060300 00	Jan.11, 2007	June 17, 2008	Method for Preparing Permanently Hydrophobic Aerogel And Aerogel Therefrom	Korea



한국소방산업기술원
45-491, 510, 511A, 512, 512B, 1428, 1480
16127-090551 Fax: 02-37-9661-1
www.kfi.or.kr

KOREA INSTITUTE OF FIRE INDUSTRY & TECHNOLOGY

의뢰시험성적서

제 2012-05-18(하)호

1. 신청인

업체명 : 한미르 주식회사
주 소 : 경기 김포시 통진읍 철야로 352-43

2. 시 료 명 : 불연(N2)

3. 접수일자 및 번호 : 2012. 05. 11. / 제 1204933 호

4. 시험결과

시험항목	기준	시험결과					비고
		1	2	3	4	5	
잔 명 시 간	10초 이내	0.0	0.0	0.0	-	-	
잔 신 시 간	30초 이내	0.0	0.0	0.0	-	-	
반 화 면 적	50 cm ² 이내	9.9	10.5	9.6	-	-	
반 화 길 이	20 cm 이내	4.3	4.5	4.2	-	-	
검 검 횟 수	3 회 이상	-	-	-	-	-	

※ 용 도 : 자체참고용(본 의뢰시험성적서는 소양실제평가결과용으로 사용할 수 없습니다.)
시험기준 : 발명성능의 기준(KFAS 1001) : 견습면적시험 후 발명성능시험

2012년 05월 18일

한국소방산업기술원 원장



비고 : 1. 위 시험결과에 부속자가 제시한 시료 및 시료명대로 시험한 결과로서 잔화 세분세 내장 분할비율은 적지는 않습니다.
2. 이 성적서도, 본 기술원내 요인 검사 결과, 불기, 불소, 불온 등 인가사항으로 시험할 수 있으며, 해당 항목에 대한 시험을 진행합니다.

☎ : 1664까지 중 1664까지



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제 2012-05-18(하)호

1. 신청인

업체명 : 한미르 주식회사
주 소 : 경기 김포시 통진읍 철야로 352-43

2. 시 료 명 : 발명(N1)

3. 접수일자 및 번호 : 2012. 05. 11. / 제 1204934 호

4. 시험결과

시험항목	기준	시험결과					비고
		1	2	3	4	5	
잔 명 시 간	10초 이내	0.0	0.0	0.0	-	-	
잔 신 시 간	30초 이내	0.0	0.0	0.0	-	-	
반 화 면 적	50 cm ² 이내	25.8	25.2	26.4	-	-	
반 화 길 이	20 cm 이내	6.8	6.6	6.9	-	-	
검 검 횟 수	3 회 이상	-	-	-	-	-	

※ 용 도 : 자체참고용(본 의뢰시험성적서는 소양실제평가결과용으로 사용할 수 없습니다.)
시험기준 : 발명성능의 기준(KOFES 1001) : 견습면적시험 후 발명성능시험

2012년 05월 18일

한국소방산업기술원 원장



비고 : 1. 위 시험결과에 부속자가 제시한 시료 및 시료명대로 시험한 결과로서 잔화 세분세 내장 분할비율은 적지는 않습니다.
2. 이 성적서도, 본 기술원내 요인 검사 결과, 불기, 불소, 불온 등 인가사항으로 시험할 수 있으며, 해당 항목에 대한 시험을 진행합니다.

☎ : 1664까지 중 1664까지



科学家团队

- 国际影响广泛的韩国科学家**SEM KING**先生领队

The main scientific and technological achievements:

Established experimentally and developed the theory of nanostructured structure of liquid semiconductors.

Developed a technology for effective protection from UV radiation coating (nanofilms and nanopowder).

Developed a transparent nanophosphors.

Developed the technology of splitting the carbon dioxide at low energy consumption.

Developed a new fire-retardant and heat insulating paint.

Has developed a nanostructured powders and granules with low thermal conductivity as a base energy-saving material for panels, blocks, bricks.

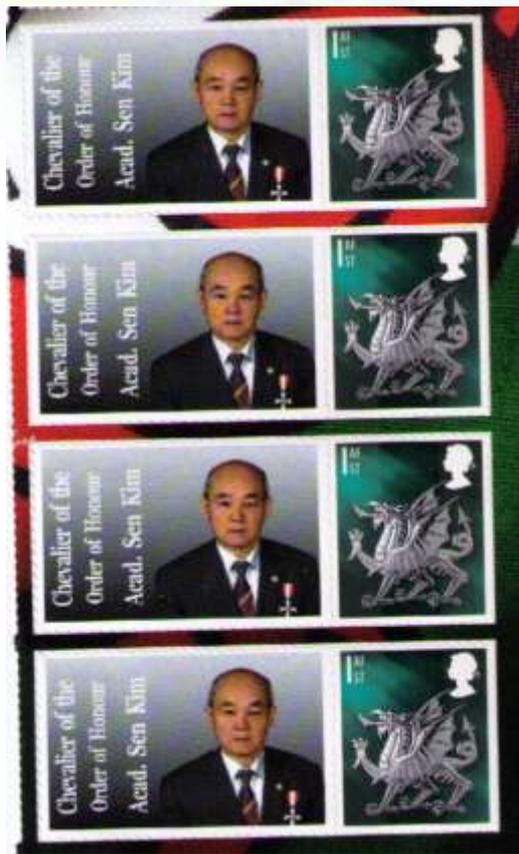
Has published 135 scientific and popular scientific works in the most highrating scientific and technical publications of the USSR, as well as Europe and Korea. Of these, about 20 patents, and 7 patents in Korea.

Since 2008, I am an academician of the European Academy of Natural Sciences.

Awarded the Leibniz medal Euler medal and the Order of Honor.

Awarded the issue postage stamps with my images in Germany and the United Kingdom.

获得殊荣

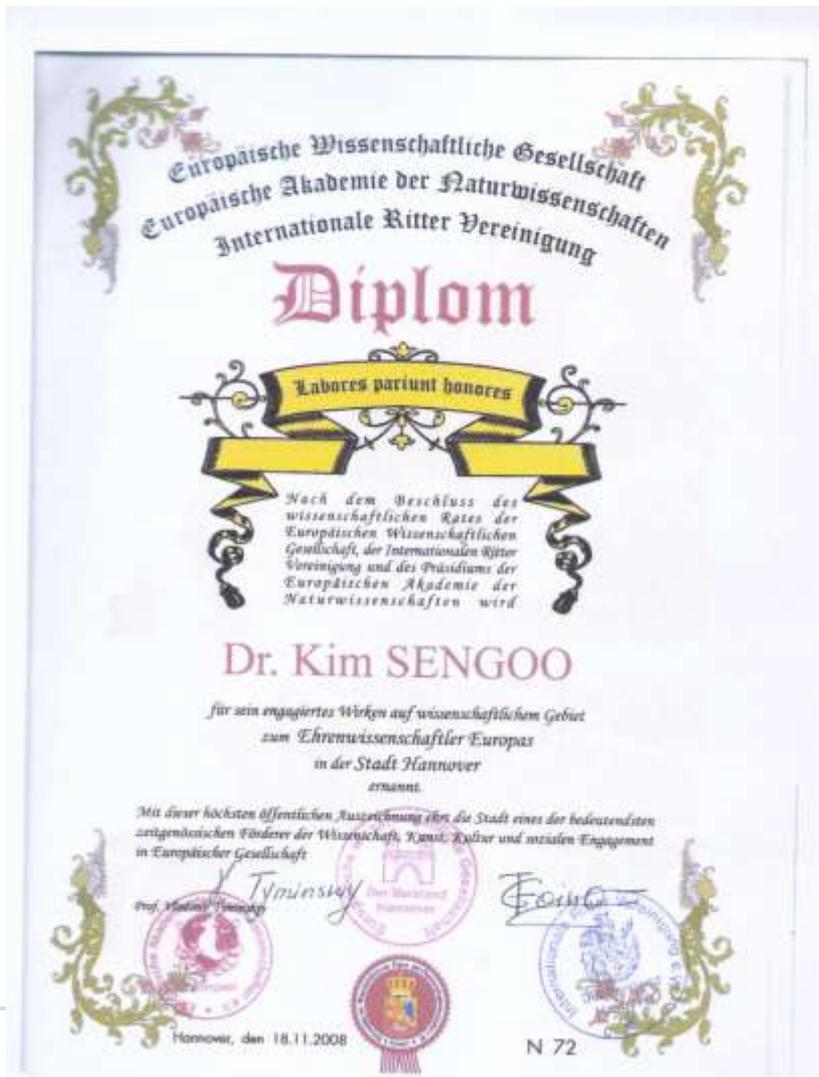


欧洲各国国家邮票

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获得殊荣



印刷著作

Publications by Sen Kim

1. The temperature dependence of ultrasonic velocity in melts of semiconducting compounds Mg_2Sn and Mg_2Pb printed. FTS, 1981, v. 15, March
2. Oscillations in the ultrasonic velocity in the electronic melts when heated in print. Akad, 1983, v. 273, № 2 4.
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9. studies of acoustic properties of melts in the systems $Mg-Sn$ and $Mg-Pb$ and assess their compressibility print ZHHF, 1984, t.58, № 8 5.

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135. Kim Sen Guk EROGRADATSIYA AND SPACE ERA Int-edition
<http://www.inauka.ru/blogs/article102993.html>, August, 2010
136. Kim Sen Guk PROTECTION FROM FLAME FAILURE Int-edition
<http://nauka.izvestia.ru/blogs/article104046.html>, November 2010
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什么是Aerogel 气凝胶？

- 气凝胶，呈固体物质形态,半透明淡蓝色,, 世界上密度最小最轻的固体。看上去像凝固的烟,因此人们也把它称为“固态烟”。
- 这种新材料密度仅为3.55kg每立方米, 仅为空气密度的2.75倍; 这种物质的成分与玻璃相似, 由于它的密度极小, 可用于航空航天领域。



气凝胶产品特性及应用范围

适合各种应用的材料的开发：

气凝胶有机涂料、气凝胶无机涂料、气凝胶耐火涂料、气凝胶防露水涂料、气凝胶纺织产品、气凝胶隔热/隔音板、气凝胶陶瓷合成物等。



气凝胶注入的纤维在绝缘和吸音方面的应用。
此纤维是抗水的，无尘的，容易安装并且价格合理



不同颜色的气凝胶陶瓷合成物的各种应用。
也可以作为粘合物使用，在陶瓷领域有很高的应用



气凝胶使用在具有强力和不易粘水的特性的有机板和无机板。
在建筑领域的绝缘和吸音方面有很高的应用。



气凝胶使用在建造和建筑方面，如水泥灰材料、
用来绝缘和抗潮的不易被水沾湿的轻量材料的应用等。

HANKOR 的高科技产品一

Hankor产品应用及优势



钢表面涂层应用，钢表面2毫米的气凝胶厚度涂层可以把不沾水的热金属板表面温度从摄氏130度降到50度



1毫米的气凝胶涂层的纸杯。极大地阻挡热的散发并把外层温度从摄氏80C降到30C，在咖啡杯和快速面/食品碗等方面有很高的应用



在汽车冷却系统抗潮管道绝缘涂层的应用。我们的实验数据显示1-2毫米的涂层每小时可以节省29.1卡热量。



耐火涂层。
4-5毫米的涂层足够阻挡1000度的火焰4-5小时，对水泥和钢表面没有任何损害。
火焰对应的表面温度不超过200度。因此对建造和建筑的水泥表面和钢的防火方面有很高的应用。

成熟产品： Fire Extinguisher 灭火剂

The extinguishing tool of aerosol form – Product feature

- Extinguishing Power**
 - It is possible to apply to most of the fires in occurring everyday life.
 - The material of reinforcing liquid is a new extinguishing material which received a new technology from the Ministry of Commerce, Industry and Energy.
 - It is possible to extinguish surely that although it is a small amount, because a resistance is excellent.
 - It is concurrently possible to apply to the effect of cooling, suffocation and no catalyst which the three effect of extinguishing.
- Safety**
 - It is possible to maintain regular emission pressure regardless of remaining amount by pauchi form.
 - It can use in the winter safely because it does not cool at the below 20°C.
 - It is not almost physical properties change though it saves for a long time.
- Convenience**
 - It is possible to use everybody regardless of people of all ages and both sexes because the use method is simple.
 - It can ensure the safe range because the spray range of reinforcing liquid is above 5m.
 - It is easy to equip anywhere owing to use of the exclusive use goods which can put on
- Eco-friendly**
 - PH is middle.
 - It can minimize soot and smoke or poisonous gas when fire was appeared.

- ✓ 美国商业部，能源部，工业部认可的新型灭火材料
- ✓ 应用于各种原因引起的火灾
- ✓ 使用量少却效果极佳
- ✓ 零下**20度**也可使用
- ✓ 体积小，放置方便
- ✓ 环保安全，烟少且无毒

成熟产品： Fire Extinguisher 灭火器



Generic can design,
easy to use aerosol can
with spray nozzle design.



Stainless Steel can design,
easy to use aerosol can
with trigger nozzle design.



Unique can design,
handle and easy to use
pump trigger.



Generic can design,
easy to use aerosol can
with heavy duty design.



Tall slender design,
easy to use
pump trigger.

HANKOR 的高科技产品二

零燃烧液-Zeroignition (Zi) Solution

Zi Products

- *Extreme flame resistance and highly efficient thermal protection - 18,000° Fahrenheit or 10,000° Celsius without ignition or flame spread.*
- *Termite and insect resistant.*
- *Water resistant and mold inhibiting. “Class A” fire ratings on Zi Products.*
- *“Zero” Flame Spread on Dry Wall and other composites.*
- *极端的阻燃性和高效率的热保护 - 华氏18000度或摄氏10000度不燃烧或火焰不蔓延*
- *抗白蚁和昆虫。*
- *防水和防霉。*
- *“A级” 防火产品的评级。*
- *干燥墙壁和其它复合材料上"零"火焰蔓延。*



HANKOR 的高科技产品二

零燃烧液-Zi Solution Product Highlights

Zi Solution and Zi Products have the following revolutionary characteristics, which, taken together, are completely new and unique:

- *Water-based, colorless (looks like water), non-toxic, pH neutral, non-corrosive and environmentally friendly.*
- *Non-Carcinogenic, does not contain bromine or any form of PBDE's (polybrominated diphenyl ethers) and does not contain any form of formaldehydes.*
- *Non-intumescent (does not swell up when exposed to fire/heat).*

ZI解决方案的产品有下列革命的特点，是全新且独特的：

- *水性，看起来像水，无色，无毒，PH值中性，无腐蚀性，对环境友好。*
- *无致癌性，不含有溴或任何形式的PBDE（多溴二苯醚），不包含任何形式的甲醛。*
- *非膨胀型（不膨胀，当暴露在火/热之中时）*



OI 零燃烧液

建设OI零燃烧液生产线

- 材料经过OI液处理后，耐温将达到 3200°C 的测试记录值 (理论值可达 4000°C 以上)
- 用途范围在建筑业、房地产业、石油化工、金属冶炼、运输工具等领域。
- 产品涵盖范围：建筑物、工业设备和产品、水泥制品、防火服装等。



成熟产品：OI Board纤维板

建设或改造现有纤维板加工厂



生产线



成熟产品：OI Board纤维板

集装箱专用地板
中国占全球95%份额

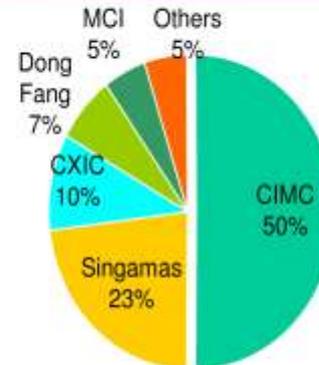


FREIGHT CONTAINER INDUSTRY

- CONTAINER MANUFACTURERS

Oligopoly. Three Manufacturers, China International Maritime Containers Group Co Ltd, Singamas Container Holdings Ltd, and CXIC Group Containers Co Ltd control 83% of the market

Est. Y2010 Global Market Share



2010 Production Estimates

CIMC 1,411,000 TEUs

Singamas 645,000 TEUs

China produces 95% of global output of containers in 2010

其他产品：防火纤维、防火门



其他产品：防火纤维、防火门



与竞品比较

- 全球性: 美国Cabot和 Aspen公司在气凝胶市场是全球的领先者。
Cabot使用的是德国技术，生产粉状的硅气凝胶。
Aspen 生产设备价值2亿美金，Aspen在很多领域有应用，包括精炼厂、衣服、国防工业等，拥有覆盖全球3亿美金的绝缘材料市场。
- 韩国国内竞争：
包括EM-POWER LTD等公司。但价格是Hankor公司的3倍

HANKOR的优势：

- Aspen和Cabot公司的气凝胶的产品价格高昂并有灰尘；
- Hankor公司生产气凝胶的过程与其他公司不同，缩短生产时间由此降低生产成本。
- 注重研发，更加适合民生应用。



4. Competitiveness

与竞争品牌的对比

Year	Process Time
1930s	4~5 months
1970s	3~4 week
1990s	15 day
2002s	5~10 day
2011s	24 hour

(Hankor process)



Company	Material	Form	Pore Diameter	Surface Area (m ² /g)	Thermal Conductivity (mW/m-K)	Density (g/cm ³)	Price
Aspen Aerogels (USA)	TEOS	Sheet	2~50nm	2~50nm	14~22	0.1~0.2	8000 won/m ² (0.7\$/ft ²)
Markettech	TEOS	Monolith	20nm	800	16	0.1	2" X 2" X 0.5": 240\$ 4" X 8" X 0.5": 1170\$
Cabot (USA)	waterglass	Powder	약 20nm	600~800	10~18	0.04~0.1	120~200 USD/Kg
Hankor Tech	waterglass	Powder	2~50nm	500~800	12~19	0.04~0.15	30-50 USD/Kg

Application

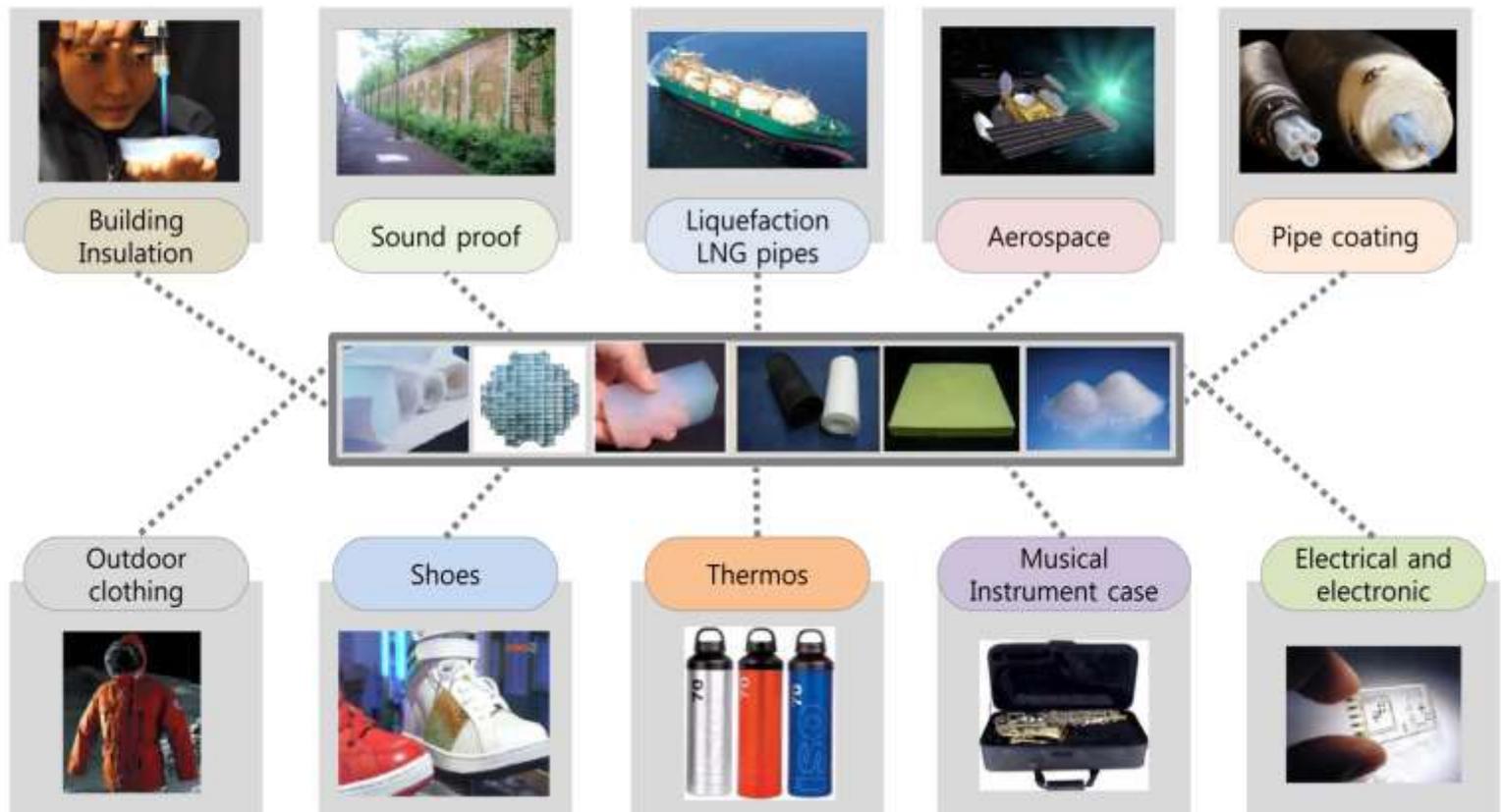
其他应用行业：民用及国防

* Aerogel has verities of potential applications in the industrial sector

Sector	Application sector
绝缘 (能量的保存)	包括天然气管道，汽车，航空，家庭， 建造材料，工业绝缘涂料，可溶解的化学制品的家庭用具 (例如提高塑料材料的特性)
环境及化学	胶片催化剂、VOC/CH ₄ 氧化、NO _x 催化剂的分解，废水废油处理
电和电子	探测器，颜料的载体，低温性的电解质，电极，阻抗，传感器， 超容量电极，锂电池电极，太阳电池板背纸
精工化学	填充物，药物运载材料，催化剂品，纳米容器，吸附剂，攫取介质
其他领域	隔音材料，衣服及鞋物的绝缘隔热，热水瓶，音乐器材的箱子等



Application



成立中国研发中心的必要性

- ✓ 面向大中华地区市场
- ✓ 填补国内空白、树立中国行业标准
- ✓ 提高中国新型防火材料技术水平，满足国内民生、国防等特殊行业的应用
- ✓ 培养人才，为国内新材料学科的研发交流提供平台。



市场与经济效益

AntiFire

- Fire Extinguisher 灭火器
- 年销售额15亿人民币，年纳税1.5亿

FireBlock

- OI Board 纤维板
- 年销售额12亿人民币，年纳税1.2亿

R&D

- 长期战略发展：民生、国防等应用研究
- 年产值超过1000亿

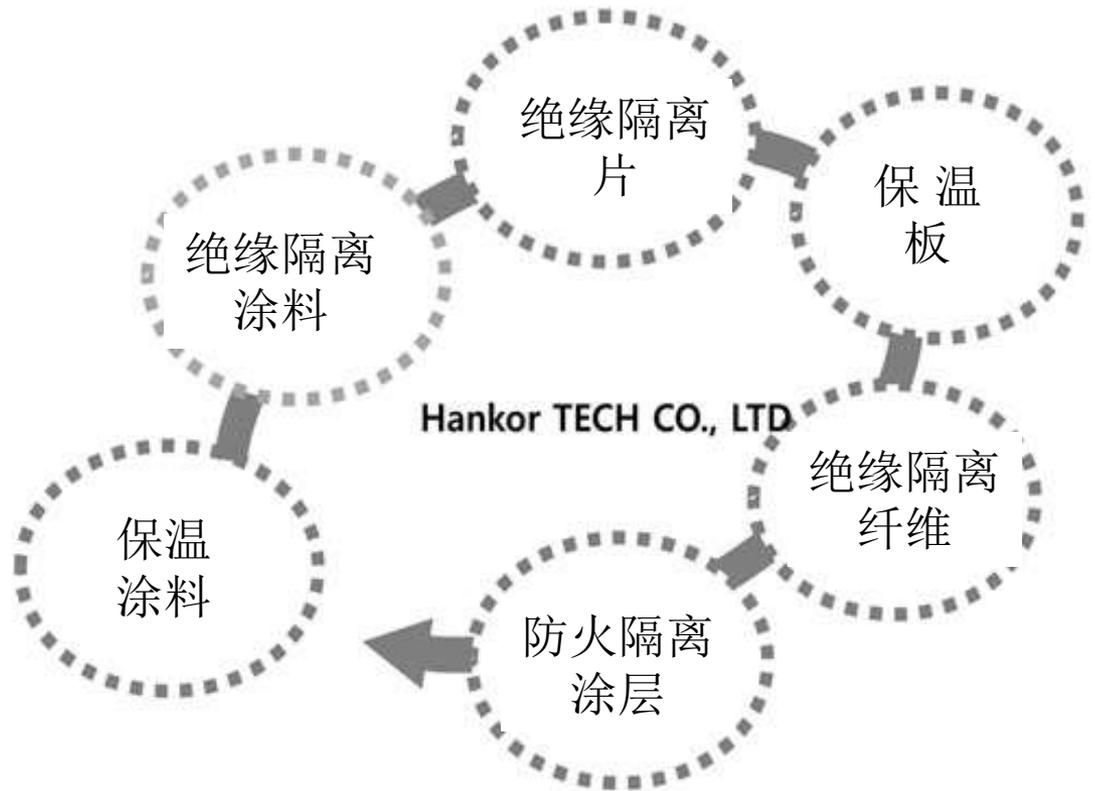


市场与经济效益

战略及规划

- 在2-3年内大规模生产，生产能力达每天1000公斤气凝胶；
- 降低生产成本保证低售价并激活气凝胶的应用市场；
- 随着气凝胶不同市场的应用，气凝胶的使用范围将被领先的国际市场最大化。

“The production cost can be reduced by our large scale production strategy which ensures low selling price and the **activation of Aerogel and application market**”



“ With the development of various Aerogel applications, scope of Aerogel will be maximized by **leading the global market** ”

目标及方向

- 在新材料研发及产业化领域与国际接轨，推动我国的新材料学科发展。
- 未来打造成为具有国家级新型防火材料研发、生产及行业代表的完整产业链的示范园区
- 并努力将园区建设成为国际新型防火材料领域的技术开发、产业发展合作的重要窗口、中国新材料产业国际化的高地，保护知识产权的典范区。



科技部国际合作专项



全球创新领袖峰会



HANKOR CHINA

愿为保护生命、财产安全

贡献一份力量！

