



Grahope

Patent Holder of Graphene Heating Film

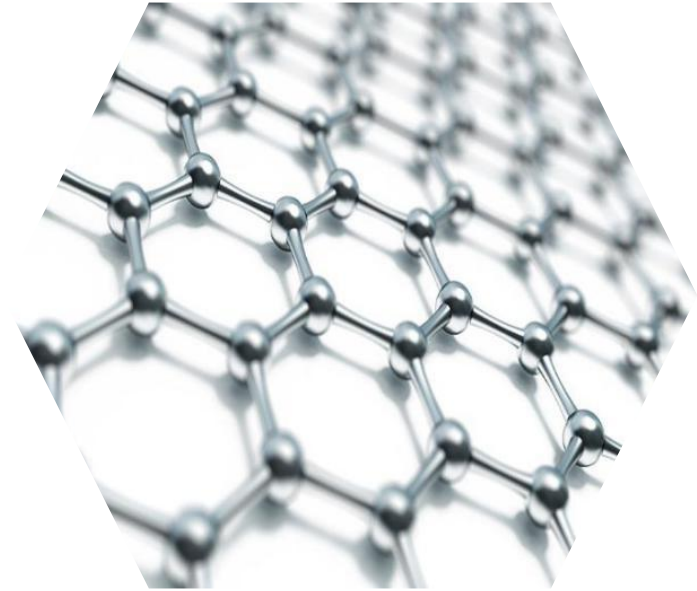
What is Graphene?

2D Nano Material :

an allotrope (form) of carbon consisting of a single layer of carbon atoms arranged in a hexagonal lattice.

Graphene is a single layer (monolayer) of carbon atoms, tightly bound in a hexagonal honeycomb lattice.

Graphene is an allotrope of carbon in the form of a plane of sp²-bonded atoms with a molecular bond length of 0.142 nanometres.



The thick of 300 layers of Graphene is 1mm:

$$0.335\text{nm} \times 3000 = 1.005\text{mm}$$

(*note: 1mm = 1, 000, 000nm)

Discovery of Graphene

Discoverers:

Andre Geim

Konstantin Novoselov



Nobel Prize in Physics in 2010

Graphene Fridays

Andre and Kostya frequently held 'Friday night experiments' - sessions where they would try out experimental science that wasn't necessarily linked to their day jobs.

One Friday, the two scientists removed some flakes from a lump of bulk graphite with sticky tape. They noticed some flakes were thinner than others. By separating the graphite fragments repeatedly, they managed to create flakes that were just one atom thick. Their experiment had led to graphene being isolated for the very first time.

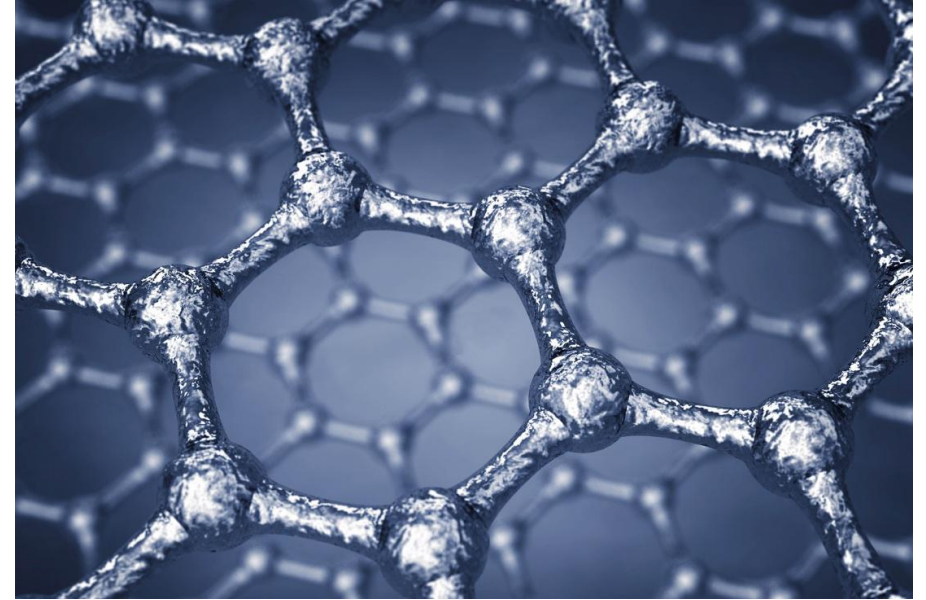
This playful approach is fundamental to how both Andre and Kostya work. It is seen as both a useful way of maintaining interest as well as a means of generating new ideas.

Revolutionary New Material in 21st Century

Properties of Graphene

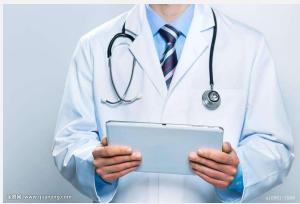
High Mechanical Strength	High Thermal Conductivity
High Conductivity	High Transparency
Biocompatibility	...

<https://www.graphene.manchester.ac.uk/learn/discovery-of-graphene/>



- 100times stonger than steels,Tensile strength and modulus of elasticity are 125 GPa and 1.1 TPa;
- The absorption rate is about 2.3% in a wide wavelength range, and the transmittance of visible light is 97.7%.
- conductivity up to $10^8 \Omega / m$, surface resistance of about $310 \Omega / m^2$
- the pure non-defective single-layer graphene has a thermal conductivity of up to $5300W/mK$;
- The extremely high specific surface area ($2630m^2/g$), much higher than graphite and carbon nanotubes

Graphene is Widely Used in Medical, Biological, Scientific, Energy and Other Fields



Medical field

- Drug delivery
- Cancer treatment
- Biosensing
- Human Body Physics



Biomedical Science

- Biocomponents, biometrics, bioimaging
- Disease diagnosis, cancer treatment, drug delivery system



Science and technology field

- Tablet PCs, electric vehicles
- Flexible screens, high-performance transistors, electronic components
- Touch screen
- Biosensor, chemical sensor, pressure sensor



New energy field

- Fuel cells, solar cells, photovoltaic solar cells
- Clean up the contaminated area of the Fukushima nuclear power plant

Other fields

- Alcoholic beverage industry, seawater desalination, etc.
- HEAD tennis racket
- Heating, ventilation and air conditioning
- Spacecraft manufacturing



01 About US

Company Profile

Patent Holder of Graphene Heating Film

Grahope New Material (GNM) was founded by Professor Feng Guanping, who is a China graphene industry pioneer. As the world's first high-tech enterprise that has implemented industrial application of graphene, GNM focuses on the R&D of graphene heating technology and the application of graphene products. It has created the world-leading patented technology of graphene heating film and filed over 30 invention patents. GNM has won many international awards for its industry-leading products.





Founder
Feng GuanPing

- Founder of graphene industry
- Founding Dean of Shenzhen Tsinghua University Research Institute
- Honorary Chairman of Jiangnan Graphene Research Institute
- International Graphene Innovation Center Expert
- President of Shenzhen Graphene Association
- President of the International Graphene Innovation Conference
- Chairman of Lihe Venture Capital



2014 | Professor Feng reported to President Xi on the graphene industrialization



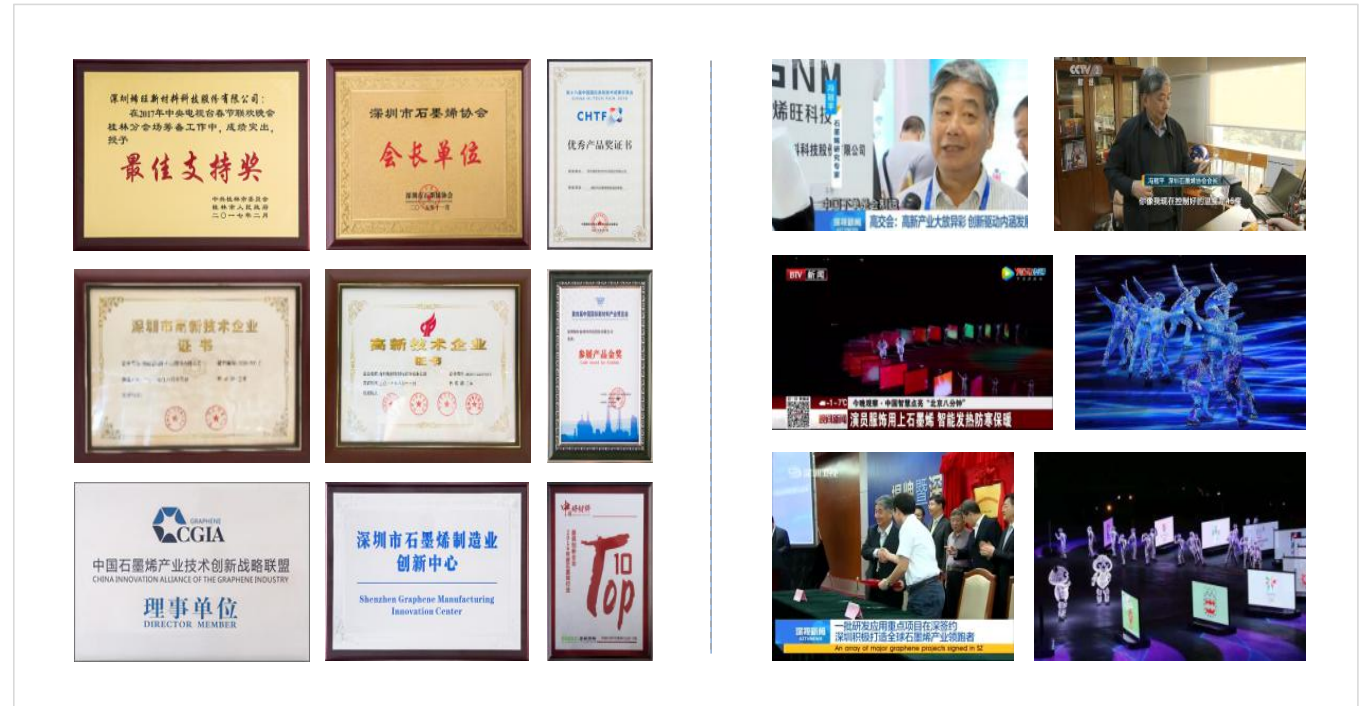
2015 | Fengguanping met with Andre Geim

Company Honors in Graphene Industry

Pioneer and leader of China's graphene industry

Enterprises and products have repeatedly received the most authoritative media reports such as CCTV, Financial Channel, Discovery Channel, Beijing Satellite TV and Shenzhen Satellite TV.

- 2017 CCTV Spring Festival Evening Equipment Sponsor
- 2018 Pyeongchang Winter Olympics Equipment Supplier
- China Graphene Industry Outstanding Contribution Award
- International New Materials Product Gold Award
- Top10, the most innovative enterprise in China
- Top 10 popular products of the high-tech fair
- China Graphene Industry Technology Innovation Strategic Alliance Director Unit Shenzhen Graphene Association President Unit
- Shenzhen Enterprise Innovation Record
- Chinese etiquette supplies top 100
- China Industry-University-Research Cooperation Innovation Achievement Award... ..



Company Strength

R&D

World leading R&D and manufacturing technologies for graphene heaters, with over 100 patents

Advanced Equipment

Large scale production lines have been developed for graphene heating film

Founder

Professor Feng, Adviser to the Committee of Experts at the International Graphene Innovation Center

Production Platform

Comprehensive production chain for graphene heating films, with professional manufacturing platforms in many regions

Investors

One of shareholder of GNM is Angel Leaguer , an important investment company In China

Subsidiaries



TianJing
TianJing North Grahope New Materials Technologies Co., Ltd

WuXi
Wuxi Grahope New Materials Technologies Co., Ltd
Wuxi Grahope Healthcare Technologies Co., Ltd

ChangZhou
ChangZhou Grahope New Materials Technologies Co., Ltd

ChengDu
Chengdu Graphene Industry Technology Application
Research Institute

Shenzhen
Shenzhen Grahope Technology Co., Ltd
Shenzhen Galife Technology Co., Ltd



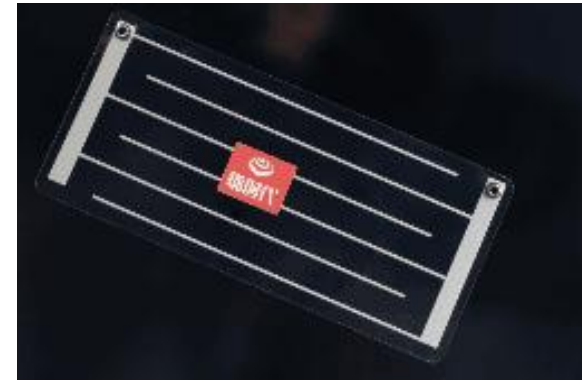
R&D and Patents

R&D

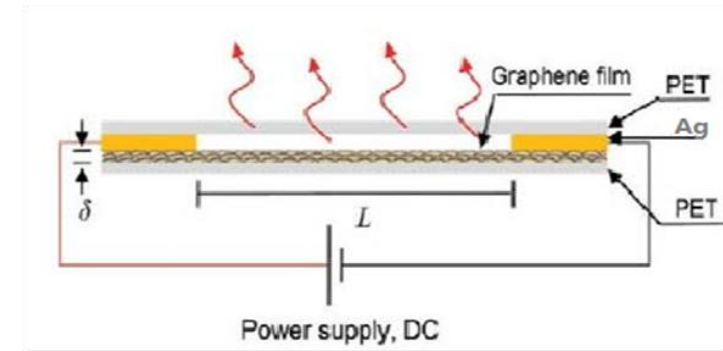
In 2009, Professor Feng Guanping introduced graphene technology to China for the first time, and led Grahope to create the world's leading patented graphene heating film. The Grahope R&D Center is located in the research institute of Tsinghua University in Shenzhen with strong scientific research strength. At present, nearly 200 patent applications have been filed, including 7 invention patents including the technical core graphene heating film, and more than 50 registered trademarks. At the same time, the company has also distributed patents in the United States, Europe, Japan and South Korea. And trademarks to protect products in domestic and international markets.

Grahope and Tsinghua University, Chinese Academy of Sciences, Jiangg'ra'hopnan Graphene Research Institute, Shenzhen Graphene Association and other universities and organizations have established a strategic technical cooperation relationship between industry, academia and research, and are at the international advanced level in graphene heating application technology.

GNM's Graphene Heating Film



Working principle



Properties of Graphene Heating Film

Planar heating

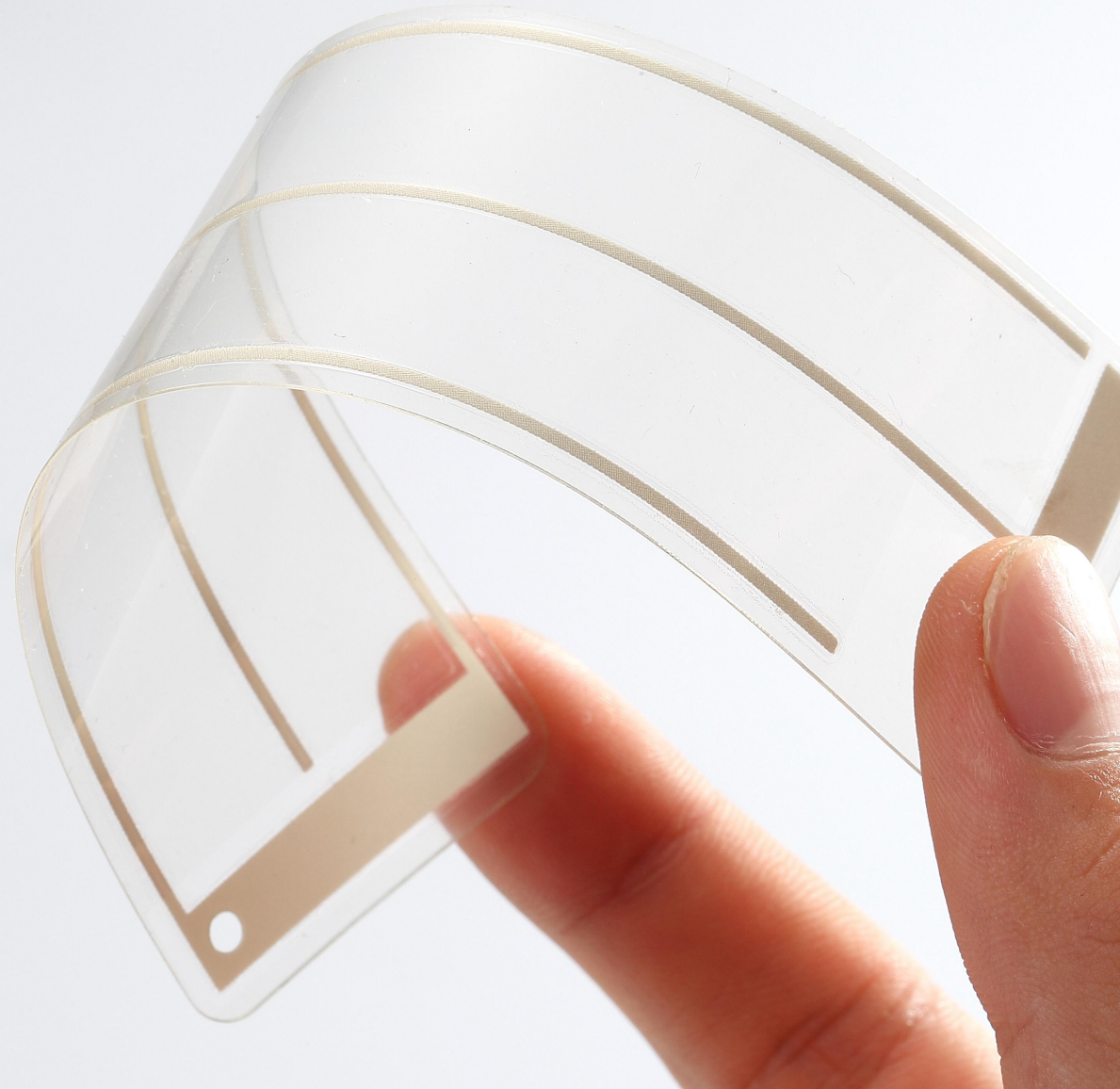
Rapidly heating, 10s reach 35°

Low voltage while high heat, can be heated to 100° with 3.7V

6-14 μ m far infrared that provides physical therapy for body

Easily converts from a low energy level to a higher energy level

Flexible, transparent, thin

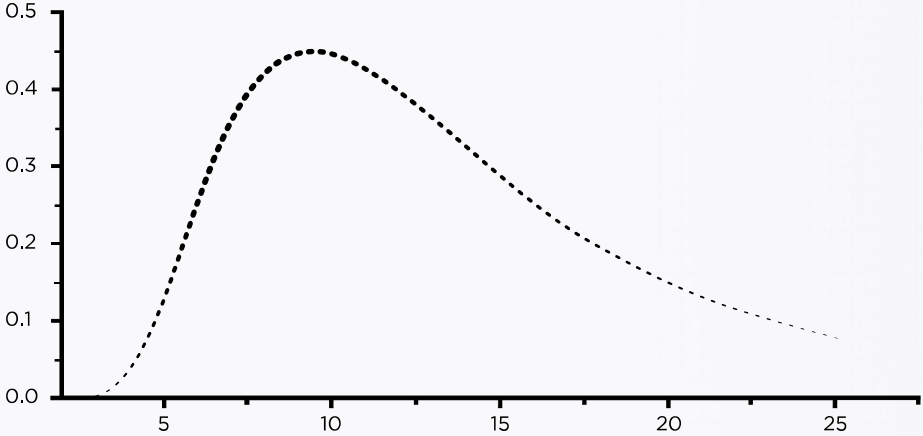




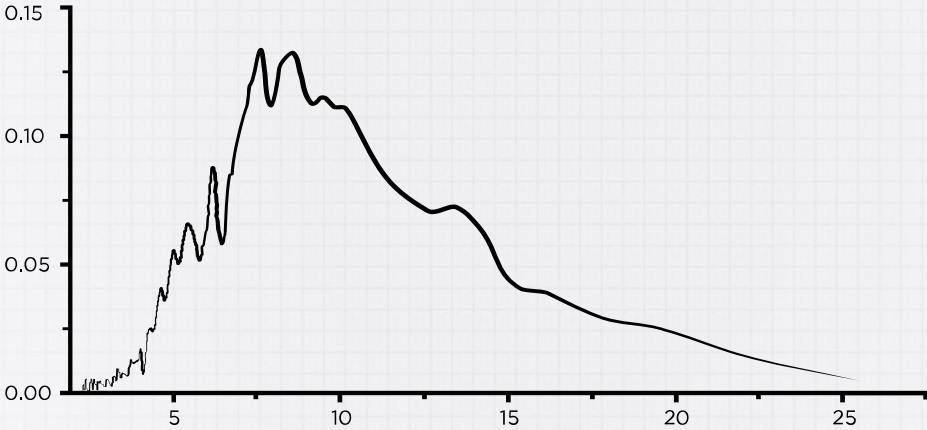
03 Products and Service

Graphene FIR, “The Light of Life”

Wavelength of the far-infrared radiation generated by the graphene heating film when it is in operation is similar to the far-infrared wavelength of the human body at 6-14 μm .



Infrared Spectrogram of Human Body



Infrared Spectrogram of Graphene Heating Film

Functions of Graphene FIR

99% high-purity medical grade far-infrared, directly applied to the body parts, more concentrated heat, strong penetration, rapid pain relief, joint pain improvement, sterilization and anti-inflammatory, functional recovery, skin care and beauty, etc., very suitable for cervical vertebrae, Prevention, treatment and rehabilitation of diseases such as shoulder circumference, lumbar muscles and lower abdomen.



Prevention

Improve the immunity
prevent disease

Treatment

Sterilization, anti-
inflammatory
Analgesia

Rehabilitation

Recovery after illness
Functional reconstruction

The Demands of Graphene Market

/ Health Care /

45+ hundreds million

Use graphene FIR features to enable products and services in the field of physiotherapy to achieve the purpose of prevention, rehabilitation and treatment of diseases.

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- Physiotherapy field
 - The field of moxibustion
 - Health field
 - Beauty and beauty field

/ Medical Treatment /

450+ hundreds million

Explore the role and value of graphene in the field of professional medicine, as the research direction of cutting-edge medical technology, and at the same time establish influence around the world.

-
- Energy release research
 - Antibacterial research
 - Medical application exploration
 - Implantable medical research
 - More...

Clinical Team & Consultants



Chen Wenliang
Chief physician

- Master of Medicine, Guangzhou University of Traditional Chinese Medicine
- Practicing Chinese medicine practitioner
- Member of the Chinese Society of Traditional Chinese Medicine
- Infrared evaluator
- Subhealth assessor



Chen Houqi
Doctor

- Doctor of Life Sciences
- Professor of University of Illinois Medical School, USA
- Vice President of the World Federation of Natural Medicine
- Associate Dean of the American College of Natural Medicine



Xu Jinsen
Doctoral Supervisor

- Fujian University of Traditional Chinese Medicine
- Deputy Chief Physician, Associate Professor
- Published more than 10 academic papers
- Peking University Chinese Core Journal contains 4 articles
- SCI includes 2 articles



Li Kewen
Doctor

- Doctor of Surgery, Fourth Military Medical University
- Deputy Chief Physician, Associate Professor
- Published more than 10 academic papers
- Peking University Chinese Core Journal contains 4 articles
- SCI includes 2 articles

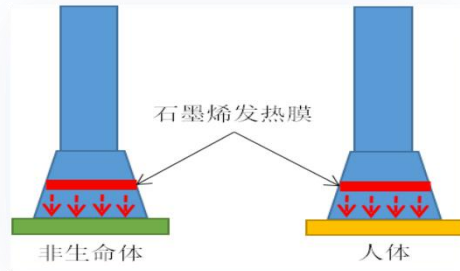


Liu Wenbo
Doctor

- Doctor of Surgery in Fourth Military Medical University
- Presided over the Science and Technology Commission of the Central Military
- Commission Special projects in the SAR, participation in the 863 Program, and more than 100 patents

Graphene Medical Outcomes

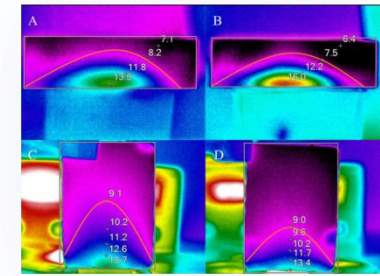
Energy release, Resonance effect, Penetration effect, Absorption effect



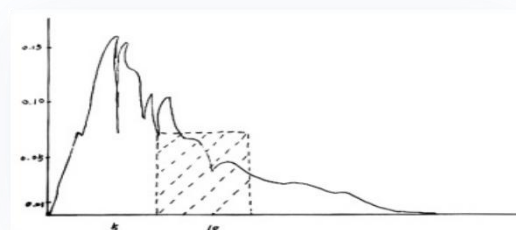
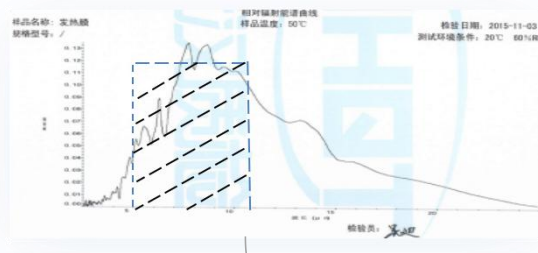
(石墨烯远红外能量吸收实验)



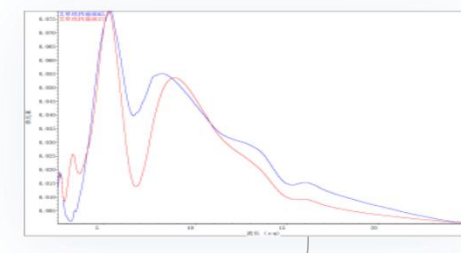
(远红外非热效应引发能量共振传递)



(石墨烯远红外渗透实验)



(石墨烯、碳纤维、艾灸远红外辐射实验)



- Graphene Far infrared resonance effect research

Proof: Far-infrared can provide energy to human cells to achieve energy transfer;

- Graphene-agar phantom/ex vivo tissue block/healthy nude mice-far infrared infiltration experiment

Proof: Graphene has a lower surface temperature, deeper penetration depth, safer and better effect;

- Graphene-far infrared energy absorption experiment

Proof: The human body can quickly absorb the far-infrared energy emitted by graphene;

- Graphene-Traditional Chinese Medicine Meridian Acupoint Acupuncture Research

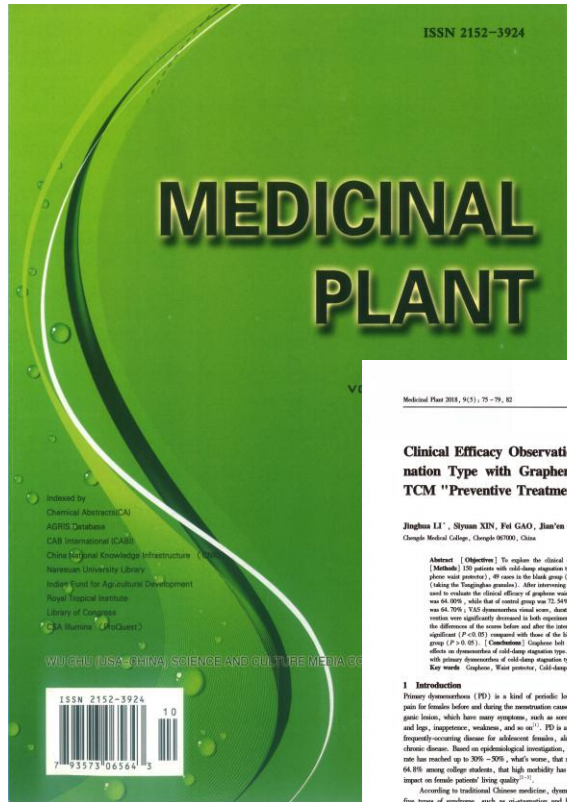
Proof: Graphene far infrared has a significant effect in relieving pain, reducing inflammation and swelling;

- Graphene-drug introduction research experiment

Proof: Graphene far infrared has a good promoting effect on drug release and body absorption.

Clinical Efficacy Observation on Dysmenorrhea of Cold-damp Stagnation Type with Graphene Thermotherapy

-- MEDICINAL PLANT



Medicinal Plant 2014, 9(1): 75-79, 82 DOI: 10.19000/1.cakl.i002122-2014.05.05.019

Clinical Efficacy Observation on Dysmenorrhea of Cold-damp Stagnation Type with Graphene Thermotherapy Based on the Idea of TCM "Preventive Treatment of Disease"

Jinghua LI¹, Shiyun XIN, Fei GAO, Jian'en GUO, Jinyang WU
Chongqing Medical College, Chongqing 401001, China

Abstract | **Objective** To explore the clinical efficacy of graphene waist protectors on dysmenorrhea of cold-damp stagnation type. **Methods** 150 patients with cold-damp stagnation type were randomly divided into 3 groups: 50 cases in the experimental group (using graphene waist protectors), 49 cases in the blank group (using the waist protectors for preventing the heating effect) and 51 cases in the control group (using the Treglinphag granules). After intervening for 3 treatment cycles, visual analogue scale and the COX menstrual symptom scale were used to evaluate the clinical efficacy of graphene waist protectors. **Results** The clinical efficacy rate of dysmenorrhea in experimental group was 64.20%, while that of control group was 72.54%. With the efficacy rate of response, the test group was 56.20% and the control group was 64.20%. VAS dysmenorrhea visual score, duration of dysmenorrhea, severity of COX dysmenorrhea and duration of response after intervention were significantly decreased in both experimental group and control group, the differences were statistically significant ($P < 0.05$), but the difference of the scores before and after the intervention, the difference of the experimental group and the control group were statistically significant ($P < 0.05$) compared with that of the blank group. There was no significant difference between experimental group and control group ($P > 0.05$). **Conclusion** Graphene belt of experimental group and Treglinphag granules of control group both have therapeutic effects on dysmenorrhea of cold-damp stagnation type. Graphene waist protectors can relieve the pain and its accompanying symptoms in patients with primary dysmenorrhea of cold-damp stagnation type.

Key words: Graphene, Waist protectors, Cold-damp stagnation type, Primary dysmenorrhea, Clinical efficacy

1 Introduction
Primary dysmenorrhea (PD) is a kind of periodic lower abdominal pain for females before and during the menstruation caused by non-organic lesions, which have many symptoms, such as soreness of waist and legs, intolerance, weakness, and so on^[1]. PD is a common and frequently-occurring disease for adolescent females, also a periodic chronic disease. Based on epidemiological investigation, the incidence rate has reached up to 30%–50%, what's worse, that reached up to 64.8% among college students, that high mortality has had a strong impact on female patients' living quality^[2].

According to traditional Chinese medicine, dysmenorrhea has five types of syndrome, such as qi-stagnation and blood stasis, congealing cold-damp, liver depression, dampness heat, qi and blood weakness and the deficiency of liver and kidney, in which the incidence rate of dysmenorrhea of congealing cold-damp is the highest in clinical practice^[3], whose etiopathology apart in congealing cold-damp and blocked meridians vessel, the disease location is uterus. Based on the therapeutic principle of "treating cold with hot drugs", thermotherapy can effectively relieve the symptoms of dysmenorrhea, such as moxibustion, electro-heating Bian-stone, thermal therapy, and so on^[4]. On the basis of taking the patent technology of graphene heating film as the new material, combined

with the principle of ergonomics and the physiotherapy effect of far-infrared life light wave, graphene abdominal protecting belt was researched and developed, which has the characteristics of rapid heating warm, relieving pain, and improving human immunity, and so on. In this study, PD patients were taken as the research objects to observe the curative effect of dysmenorrhea using graphene waist protectors, thereby providing data support for its clinical popularization and application.

2 Materials and methods

2.1 General materials Cases from Chongqing Medical College and Hebei Normal University for Nationalities were collected, then these cases were screened according to inclusion and exclusion criteria, finally 150 qualified cases were chosen, subjects were randomly divided into three groups based on the method of random number table. In 51 females of the experimental group, 50 females were treated in 52 females of the control group, 51 females were treated in 52 females of the blank group, 49 females were treated. Total admission rate was 3.84%, which was less than 15%, conforming to statistics requirement.

2.2 Baseline information of patients from three groups According to the comparison on the differences of age, disease course, severity degree of the COX, Menstrual Symptom Scale (MSS), COX classification, Visual Analogue Scale (VAS) score and pain duration of three groups of subjects, the differences had no statistical significance ($P > 0.05$), showing that the homogeneity of three groups of subjects were balanced and had comparability (Table 1).

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The study shows that the effects of graphene belly belt on relieving the clinical symptoms of dysmenorrhea of cold-damp stagnation type and its accompany symptoms were doubtless.

The vibration frequency of far infrared wave emitted by graphene was close to that of cellular elements inside the human body, thereby generating thermal energy by molecular resonance, causing temperature increment, promoting blood circulation especially speeding up microcirculation, improving oxygen supply, strengthening cell regeneration ability, allaying tiredness, improving the immunity of organism.

Graphene Health Care Products

Subverting traditional heating technology, using graphene's excellent electrical and thermal conductivity and far-infrared physiotherapy, it can easily achieve multiple functions such as health therapy and sports protection.



Graphene FIR Sauna Room

Graphene far-infrared energy room, using North American imported solid wood structure combined with glass door, built-in negative ion oxygen bar, unique frequency conversion technology, energy saving nearly 30%. It contains graphene far-infrared heating plate, 360 degree surround illumination. It can effectively eliminate toxins, promote blood circulation, relieve stress, remove hurricane and remove cold.



Graphene Beauty Care Products



Rejuvenate and tighten the skin

Deep rejuvenation revitalizes, activates skin vitality, tightens skin



Accelerating Blood Circulation

Promotes cell activity and metabolism, deep cleansing of the skin



Deep Infiltration, Better Absorption

Enhance the absorption of skin care products 15 times more



Graphene Heating Clothes

Completely overturns the traditional wearing method for thousands of years, combining the unique heating performance of graphene with the pursuit of wind in people's cold weather, replacing the thickness with temperature, and it can withstand the cold in the cold winter.



Graphene Home Textiles

Graphene smart home textile series, under the comfortable fabric, hidden high-tech strength of graphene, give you a warm and physiotherapy care, ultra-low voltage safe use and more peace of mind, inject new meaning for smart life.



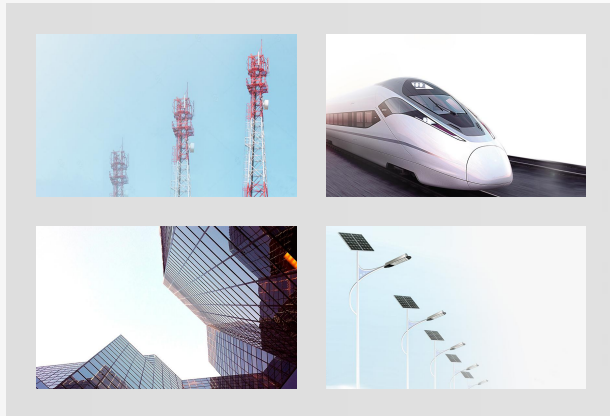
Household Heating Applications

The graphene household heating series redefines the traditional heating method. Through the excellent electrothermal conversion performance of graphene and the far-infrared heat radiation conduction mode, the household can achieve rapid heating and can easily enjoy the sun indoors.



Graphene Powder Coating

Based on the excellent performance of graphene, increase the effects of coating ratio, enhanced powder coating mechanical, weather corrosion resistance, thermal conductivity, etc.





Vision of “2 Halves”

Reduce the times of
worldwide people
seeing a
doctor **by half**

Reduce the number of
patients suffering from
chronic diseases
by half



T H A N K S

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