Chemical Sciences

Call for proposals

GDST-NWO science industry cooperation programme Chemistry of Advanced Materials

Version August 2016

广东省科学技术厅

Guangdong Provincial Science and Technology Department

The Hague, August 2016
Netherlands Organisation for Scientific Research

Contents

1 Introduction

1.1 Background

Policy Basis
China is the world's biggest producer of chemicals. Within Europe, the Netherlands ranks third in chemicals sales, behind Germany and France. Within the Netherlands, the chemical industry is one of the biggest investors in R&D and innovation. A number of chemical companies with Dutch roots are very active in China, both in production and in R&D. On the other hand, Chinese companies invest in the Netherlands or acquire Dutch companies.

This intense economic relationship is accompanied by extensive scientific collaboration between Dutch and Chinese researchers in chemistry and chemistry related fields. On a national level, a number of governmental organizations has already for many years promoted and supported the scientific exchange and collaboration between the two countries.

In view of the priority given in both China and the Netherlands to the acceleration of innovation and the promotion of scientific excellence, the chemical sector is perfectly positioned to make a substantial contribution. China and the Netherlands therefore aim to strengthen the cooperation in the chemical sector between science and industry, specifically in the field of Advanced Materials. Within China the focus will be on collaboration with Guangdong Province, in GDP the biggest province in China, and host to an impressive array of industries.

Vision: creating a Sino-Dutch community in Advanced Materials
The availability, use and re-use of materials is one of the grand societal challenges on which the world's prosperity depends. Guangdong Province and NWO will join forces in order to tackle these challenges. Together they will implement a science industry cooperation programme for Chemistry of Advanced Materials.

This programme will fund five or six projects. Each of these projects will have a number of junior researchersin the Netherlands and in China, jointly funded by NWO, Guangdong Province and industry. In this way, up to approximately 20 junior researchers can be funded. Together with their academic and industrial supervisors, i.e. at least 20 senior researchers, a total of about 40 experts will be involved.

The Guangdong-NWO programme is closely related to a joint programme of the National Natural Science Foundation China (NSFC) and NWO. In 2015 these organizations have selected six joint Sino-Dutch research projects of a more fundamental nature for funding. In total, the NSFC-NWO programme will involve twelve junior researchers (PhD students, postdocs). Together with their senior supervisors in both China and the Netherlands, they will create a Sino-Dutch community of about 20 to 30 experts in Advanced Materials.

Recently, NSFC and NWO have decided to publish in 2017 a call for proposals in the closely related field of catalysis and supramolecular chemistry. This will lead to the addition of another five or six projects to the Sino-Dutch community.

All in all, the Guangdong-NWO science industry cooperation programme and the NSFC-NWO programmes will create a Sino-Dutch community of more than 100 experts, covering both fundamental and applied R&D aspects of Advanced Materials.

1.2 Available budget

The available budget for this Call for Proposals allows for the funding of 5 or 6 eligible joint projects of high quality.

On the Dutch side, the budget has three sources:

- NWO Chemical Sciences: a maximum of M€ 1,5 (= appr. M¥ 11), to be supplied from the Innovation Fund Chemistry
- Companies participating on the Dutch side of the projects are required to contribute k€ 75 in cash per project.

Hence, in total about M€ 2 (= appr. M¥ 15) will be available. Of this, 95% will be allocated to the execution of projects, the remainder NWO will reserve for the costs of the management of the programme (e.g. organization of meetings, travel costs, brochures, website etc).

On the Chinese side, the budget has two sources:

- GDST: between 6 and 9 Million RMB (= appr. K€ 835 – M€ 1,25), to be supplied from the International Science & Technology Cooperation Programme.
- Companies participating on the Chinese side of the projects are required to contribute the same amount, i.e. 6-9 Million RMB, in cash.

Hence, in total there will be 12-18 Million RMB (= appr. M€ 1,7 – M€ 2,5) available. Of this 100% will be allocated to the execution of projects. Guangdong Province uses additional sources to cover the costs of the management of the programme (e.g. organization of meetings, travel costs, brochures, website etc).

1.3 Validity of the call for proposals

This call for proposals is valid until the closing date 15 September 2016.

2 Aim

The Government of Guangdong Province and NWO initiate their cooperation with the aims to:

1. Promote economic growth through strategic international innovation cooperation;
2. To explore ways to improve collaboration between industrial, academic and government parties from Guangdong Province and the Netherlands;
3. To support and accelerate innovation in the field of Chemistry of Advanced Materials;
4. Initiate joint science industry cooperation projects of mutual interest;
5. To lay the foundations of a Sino-Dutch community in Advanced Materials, with the participation of industrial, academic and government parties.

3 Guidelines for applicants

3.1 Who can apply

Projects have a **Chinese Leading Applicant** and a **Dutch Leading Applicant**.

A. Requirements for the **Chinese Leading Applicant** are:

The Chinese Leading Applicant can be either a senior researcher (i.e. associate professor and up, employed by a university or a research institute) or a senior engineer (employed by a company).

B. Requirements for the **Dutch Leading Applicant** are:

The Dutch Leading Applicant has to be a researcher from one of the following knowledge institutions:

- Dutch universities;
- NWO and KNAW institutes;
- the Netherlands Cancer Institute;
- the Max Planck Institute for Psycholinguistics in Nijmegen;
- researchers from the DUBBLE Beamline at the ESRF in Grenoble;
- NCB Naturalis;
- Advanced Research Centre for NanoLithography (ARCNL).

They are

- Associate, assistant and full professors at Dutch universities and persons with comparable positions at university medical centres, who hold a tenured appointment or have a contract for at least the duration of the research for which the application is submitted.
- Researchers with a tenure-track appointment. NWO defines a tenure-track appointment as an appointment for experienced scientific researchers with the prospect of a tenured appointment or a professorship. The tenure-track appointment must have been agreed upon in writing and be funded from structural funds. NWO will verify whether the appointment satisfies these conditions and whether this is guaranteed for the duration of the project.
- Tenured scientific personnel from NWO and KNAW institutes and the Netherlands Cancer Institute.

If funding is awarded, the Dutch Leading Applicant will become the Dutch Project Leader and will bear final responsibility on the Dutch side for the realisation of the research including the plan for knowledge dissemination. Co-applicants should have an active role in the realisation of the project.

The following applies to Dutch Leading Applicants and co-applicants with a part-time appointment:

- Dutch Leading Applicants and co-applicants who work part-time should at least have access to sufficient university facilities and budget to be able to realise the project properly.
- Dutch Leading Applicants and co-applicants must carry out NWO-funded research in the time that they work for the research institution. If that is not the case then the other employer (if applicable) must sign a waiver so that intellectual property is safeguarded for NWO and the knowledge institution(s).

Who may not be the Dutch Leading Applicant?

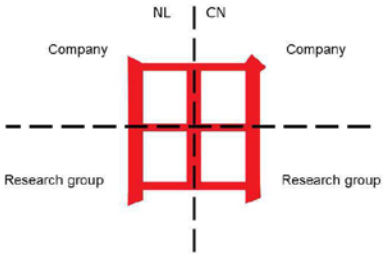
- Personnel with a zero-time appointment;
- Personnel with a temporary appointment (e.g. postdocs);
- Emeritus professors;
- Personnel from institutes with an applied or technological objective, such as TNO, the Large Technology Institutes (GTIs) and the non-university part of Wageningen University and Research Centre;
- Personnel from a research institution funded by a public-private specific-purpose grant;
- Personnel from foreign research institutions.

3.2 What can be applied for

A. Structure of a joint project

Joint projects can have a structure involving (at least) three or four parties. Projects involving (at least) four parties are strongly encouraged.

Projects involving at least four parties have this structure:



On the Chinese side:

- One or more companies wishing to do innovative research in China
- One or more Chinese research groups

Of these, at least one company or at least one research group is required to be an independent legal entity registered in Guangdong Province. This party will provide the Chinese Leading Applicant. (see also section 3.1).

On the Dutch side:

- One or more companies wishing to do innovative research in the Netherlands
- One or more Dutch research groups

Of these, only one of the research groups can provide the Dutch Leading Applicant, who must be a senior researcher. The research groups must be part of a university or research institute recognized by NWO (see also section 3.1).

Projects involving at least three parties consist of:

- One or more Chinese research groups
- One or more Dutch research groups
- One or more companies wishing to do innovative research in China OR one or more companies wishing to do innovative research in the Netherlands.

Each Sino-Dutch consortium applying for funding formulates in its research proposal:

(a) their common goals;
(b) activities to reach these goals;
(c) the resources they need to execute the project;
(d) which of these resources can be supplied by GDST, NWO and industry, taking into account the funding regulations of Guangdong and NWO.

There needs to be a certain balance in the work packages executed in the two countries. In fact, this is one of the evaluation criteria: that the project activities performed in the two countries constitute together one meaningful project.

Note the contribution of GDST to the project has to be spent in China, the contribution of NWO to the project has to be spent in the Netherlands. For companies it is possible to contribute financially to the research done in the other country (i.e. it is allowed that Chinese companies contribute to the Dutch side of the project and/or Dutch companies to the Chinese side). Guangdong and NWO have some differences in the conditions for the spending of the funds they provide (see below).

NWO provides the granted funding to the Dutch Leading Applicant, Guangdong Province provides the granted funding to the Chinese Leading Applicant. The Leading Applicants have the responsibility to distribute the funding among the consortium members in his/her country. Within a consortium, the Dutch and the Chinese Leading Applicant are jointly responsible for the execution of the project plan.

B. Dutch side of the project

The types of activities for which applicants can get funding from NWO are:

- employment costs of at least one Postdoc researcher (for a maximum of 36 man-months) or one PhD researcher (for 48 man-months);
- travel expenses and accommodation costs for researchers involved in the project;
- contribution to material costs;
- contribution to laboratory and/or equipment costs.

Projects have a fixed budget of k€ 300:

- k€ 225 from NWO
- k€ 75 (in cash) from the compan(y/ies) based in the Netherlands

Of this, k€ 285 is available for the execution the project. NWO will use k€ 15 for programme management.

NWO funding can be spent within a maximum period of 5 years.

C. Guangdong side of the project

The types of activities for which applicants can get funding from GDST are:

(1) Direct expenses for:

- Equipment
- Materials
- Experiments, tests, processing and outsourcing
- Fuel and power
- Travel & Conference
- International cooperation and exchange
- Publishing / literature / information dissemination / intellectual property rights
- Rental
- Personnel
- Expert consulting
- Other

(2) Indirect expenses (should not exceed 5% of the GDST fund)

The budget that can be applied for per project is 2 to max. 3 Million RMB (= 1 to 1,5 Million RMB from GDST plus the same amount from the compan(y/ies) participating in the project).

Guangdong funding has to be spent within a period of 2 years. At the end of these 2 years, it is possible to ask for additional funding to extent the project 1 or 2 years. Even this extension can be extended for another 1 or 2 years. The maximum duration of a project, including one or two extensions, is 5 years.

3.3 When can applications be submitted

The **Chinese Leading Applicant** submits the Chinese application on or before **15 September 2016, 14.00h (CST)** to **GDST**.

The **Dutch Leading Applicant** submits the application in English also on or before **15 Sptember 2016, 14.00h (CET)** to **NWO**.

Applications that are submitted after the deadline will not be included in the procedure.

3.4 Preparing an application

Applicants have to submit two applications:
- To NWO: an application in English, made using the NWO application format
- To GDST: an application in Chinese, made using the GDST application format.

The NWO application has to be added as an appendix to the GDST application, the GDST application has to be added as an appendix to the NWO application.

Please check the application format about the other required appendices. Be aware that the preparation of some of these appendices (e.g. a letter of intent with regards to IP rights, signed by all parties involved in the application) can take (a lot of) time.

On the Dutch side

- Download the application form from the electronic application system ISAAC or from NWO's website (on the grant page for NWO-GDST science industry cooperation programme).
- Complete the application.
- Save the application document as a pdf file.
- Add the GDST application as an appendix.
- The Dutch Leading Applicant submits the application document to NWO through ISAAC.

On the Chinese side

- Follow the instruction on the GDST-website, www.gdstc.gov.cn
- Add the NWO application as an appendix.
- The Chinese Leading Applicant submits the application document to GDST.

3.5 Specific conditions

It is required that all parties involved in a consortium that is selected for funding sign a **Consortium Agreement**. This Consortium Agreement has to be signed within two months after the selection decision is taken. Consortiums are therefore advised to prepare their Consortium Agreement, in order to have it (almost) finalised when the decision is taken at the end of 2016. As a service to the applicants, NWO and GDST will provide a standard format for a Consortium Agreement.

3.6 Submitting an application

Submitting to NWO

An application can only be submitted to NWO via the online application system ISAAC. Applications not submitted via ISAAC will not be considered. A principal applicant must submit his/her application via his/her own ISAAC account. If the principal applicant does not have an ISAAC account yet, then this should be created at least one day before the application is submitted to ensure that any registration

problems can be resolved on time. If the principal applicant already has an NWO-account, then he/she does not need to create a new account to submit an application.

When you submit your application to ISAAC you need to enter several additional details online. Make sure you allow enough time for this.

For technical questions please contact the ISAAC helpdesk, see Section 5.2.1.

Submitting to GDST
Follow the instructions on the GDST website, www.gdstc.gov.cn

4 Assessment procedure

4.1 Procedure

The NWO Code of Conduct on Conflicts of Interest applies to all persons and NWO staff involved in the assessment and/or decision-making process.

1. Eligibility check: both NWO and GDST check the eligibility of the proposals. This is done using the conditions stated in Chapter 3 of this call for proposals.
2. On the Dutch side, the quality of the proposals will be assessed by (international) referees, according to the criteria specified in section 7.2. Each proposal is sent to preferably four independent scientific experts (two Chinese, two Dutch[1]). All the referees will receive the same questions about the applications. The answers to these questions form a review report of 2 to 4 pages about a proposal. In this way, there will be four review reports per proposal.
3. NWO sends all the anonymous reviews (both the Dutch and Chinese) to the Dutch Leading Applicant. He/she is given the opportunity to write a rebuttal to the referees' comments. This rebuttal should not exceed two pages.
4. On the Guangdong side, the quality of the proposals will be assessed through the uniform annual Guangdong Science and Technology program projects assessment procedure with further information refer to www.gdstc.gov.cn.
5. China and the Netherlands use their own way of appointing members to a joint Assessment Committee.
6. The Assessment Committee has one meeting. This will be held in Guangdong Province. During this meeting the Assessment Committee assesses and ranks the proposals on the basis of the criteria specified in section 7.2. Input for the assessment is: (a) the proposals, (b) the review reports of the referees about the proposals, (c) the rebuttals made by the Dutch Leading Applicant.
   Based on its assessment and ranking, the Assessment Committee will recommend proposals for funding.
7. The Assessment Committee sends its ranking and funding recommendation as an advice to GDST and NWO Chemical Sciences.
8. Joint approval: (representatives of) the Boards of GDST and NWO Chemical Sciences jointly decide on the projects to be funded.

Timetable

15 September 2016	Deadline submission of proposals
September 2016	Eligibility check
October 2016	Independent referees make review reports of eligible proposals
Late October 2016	Dutch Leading Applicants have the opportunity to submit a rebuttal to the review reports

[1] Because the Netherlands is a much smaller country than China, NWO almost always relies on international, i.e. non-Dutch, referees. In China, the reviewing will be done by Chinese referees.

November 2016	A Joint Assessment Committee assesses and ranks the proposals; the Committee sends its advice to the boards of GDST and NWO Chemical Sciences;(Representatives of) the boards of GDST and NWO jointly decide on the selection of the projects
December 2016	All applicants are informed about the joint decision[2]
1 January 2017	Earliest date for start of projects
March 2017	Definitive funding decision Guangdong (see section 5.2)

4.2 Criteria

Referees will score the proposals on the criteria below. The score range is:

- excellent: 85-100 points
- good: 75-85 points
- qualified:60-75 points
- failed:60 points or less than 60 points.

For each of the criteria, the referees will also provide a written comment.

First class indicators	Secondary indicators and evaluation content	Full Score	Weight
Project basis 20%	1.1 The project significance and the clarity of the project objectives.	100	8%
	1.2 The comprehensiveness and accuracy of the analysis of current development situation and trend in home and abroad.	100	5%
	1.3 Accuracy of the analysis of the industry development and project prospect.	100	7%
Project plan and method 30%	2.1 The accuracy of the key technology selection and the feasibility of the research method adopted.	100	12%
	2.2 Characteristics and innovative features of the project.	100	8%
	2.3 The rationality of the project planning and scheduling.	100	5%
	2.4 The rationality of the project budgets	100	5%
Research foundation 25%	3.1 Previous R&D foundation related to the project.	100	11%
	3.2 Research experience of the applicant organization.	100	8%

[2] NWO gives all proposals a qualification. The applicant is informed of this qualification when the decision about whether or not to award funding is announced. For further information about the qualifications see www.nwo.nl/kwalificaties.

	3.3 The rationality of the organizational working structure and labor division (Notice: Industry-university-research projects should consider whether to establish a cooperation mechanism and the close degree of the work division of participated organizations; International cooperation projects should consider whether they have the basis for international cooperation, i.e. whether there is added value in the Sino-Dutch cooperation, and complementarity of the Dutch and Chinese partners in the consortium)	100	6%
Project performance 25%	4.1 The evaluation indicators for project acceptance are specific, measurable and reasonable.	100	5%
	4.2 The prospected economic indicators are clear, reasonable, and can produce good direct/indirect economic benefits.	100	10%
	4.3 The project is prospected to promote social development, science and technology progress, industrial upgrading, energy conservation, environmental protection, talents cultivation and have other social benefits.	100	10%
Total		1300	100%

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Degree of the expert's familiarity with this project	☐ High (1) ☐ Relatively high (0.8) ☐ General (0.6)
Comprehensive Evaluation	Comprehensive evaluation opinions (Comprehensive evaluation and suggestion on the project):

5 Contact details and other information

5.1 Contact

5.1.1 Specific questions

For specific questions about the GDST-NWO science industry cooperation programme Chemistry of Advanced Materials and this call for proposals please contact:

At NWO:
Dr. Mark Kas, m.kas@nwo.nl, tel. +31 6 20593 207

At Guangdong Science & Technology Exchange Center:
Mrs. Geng Yan, gengy@ste.gd.cn, tel. +86 20 83163249
Mrs. Wu Weiwei, wuww@ste.gd.cn, tel. +86 20 83163303
Mrs. Xu Zhe, xuz@gdstc.gov.cn, tel. +86 20 83163861

5.1.2 Technical questions about the NWO electronic application system Iris

For technical questions about the use of ISAAC please contact the ISAAC helpdesk. Please read the manual first before consulting the helpdesk. The ISAAC helpdesk can be contacted from Monday to Friday between 10:00 and 17:00 hours CET on +31 (0)900 696 4747. Unfortunately, not all foreign telecom companies support calling to 0900-numbers. However, you can also submit your question by e-mail to isaac.helpdesk@nwo.nl. You will then receive an answer within two working days.

5.2 Other information

Financial handling of projects selected for funding
There are some differences between NWO and Guangdong in the handling of the financial aspects of selected projects.

NWO
When the Board of NWO Chemical Sciences decides on the selection of projects, it also decides on the funding for the Dutch side of the projects. The decision is conditional: the consortium has to provide a signed Consortium Agreement within two months after the funding decision was taken. The project has to start within six months after the decision. If one of these conditions is not met, the funding can be annulled.
The grant is paid to the research organisation employing the Dutch Leading Applicant. During the runtime of the project the grant is paid in x+1 installments, in which x is the runtime of the project in years.
The participating compan(y/ies) pay their contribution to NWO in installments agreed upon in the Consortium Agreement. NWO also receives the subsidy from TKI Chemistry. NWO ‘combines’ is own funding with the contribution of the compan(y/ies) and the TKI-subsidy into the grant that is paid to the organisation of the Dutch Leading Applicant.

GDST

After the selection decision is made, GDST sends the selected projects to its Financial Department for financial assessment. The selection decision is conditional: the consortium has to provide a signed Consortium Agreement within two months after the funding decision was taken. The project has to start within six months after the decision. If one of these conditions is not met, the funding can be annulled.

The assessment by the Financial Department is completed in February 2017. The result is reported to the CPC's People's Congress of Guangdong, which convenes in March 2017. During the Congress, the funding is committed to the projects. In April 2017 the grant will be paid to the organisation employing the Chinese Leading Applicant. The total grant is paid in one installment.

6 Annexe

Thematic focus for the bilateral GDST-NWO science industry cooperation programme on Advanced Materials
荷兰科学研究组织-中国国家自然科学基金先进材料联合研究项目征集通知的主题聚焦

Challenges 挑战

The world's population is growing substantially and so is its standard of living. As a consequence, the demand for raw materials increases significantly, such as for oil, rare earth metals and phosphorus. Whereas oil is essential for energy, chemicals and high performance materials (plastics, fibers, etc.), minerals and metals are crucial in numerous products (electronics, catalysts, solar cells, wind turbines, fertilizers, etc.). All of these will become scarce either by exhaustion or by increasing difficulties in mining them. Therefore, solutions are needed to overcome this upcoming scarcity. Moreover, because of the globally increasing standard of living, society also requires novel materials with innovative features.

世界人口大幅增长，生活水平也大幅提高。随之而来对原材料—如石油、稀土金属和磷—的需求显著增长。石油主要是作为能源的需求，而化学品和高性能材料（塑料，纤维，等），矿产和金属却在许多产品中都至关重要（电子产品，催化剂，太阳能电池，风力涡轮机，肥料，等）。所有这些将或因资源耗尽或因开采难度越来越大而变得供应不足。因此，需要找出解决即将到来的这种供应不足的方法。而且由于全球性生活水平的提高，社会也对具有创新性特性的新型材料产生需求。

Challenges can be found in the following fields:

挑战可能在以下领域存在：

Resources: material for separation and treatment of waste streams; recyclable materials; biodegradable material; utilization of greenhouse gasses.

*资源：*分离和处理废物流的材料；可循环使用的材料；可生物降解的材料；温室气体的利用。

Energy: energy and feedstock efficient production of building blocks for the future; materials for storage of energy.

*能源：*节省能源和原料的未来建筑模块生产；储存能源的材料。

Food & Bio-economy: new materials with new functionalities and applications; smart packaging.

*食品&生态-经济：*具有新功能和用途的新材料；智能包装。

Construction industry and Transport: light but sturdy materials; smart, self-healing paint; functional additives for coatings; organic and inorganic smart and resilient composites.

*建筑和交通产业：*轻便又坚固的材料；智能的，自我修复的油漆；涂料的功能添加剂；有机及无机的智慧和弹性复合材料。

Health: self-healing materials and 'intimate technology'; functional sportswear, biomedical materials, packaging for functional and healthy food.

*卫生健康：*自我修复材料和"亲密技术"；功能性运动装，生物医药材料，功能性和健康食品的包装。

Directions for solutions 解决问题方向

Currently, we are witnessing a revolution in both our understanding and the control of complex forms of matter. Complex systems (organic, inorganic and hybrid) are composed of individual entities (molecules, viruses, colloids, nanocrystallites, etc.). Using self-organization on a larger scale in space and/or time, interactions between these entities result in new properties.New nanostructured materials and chemical synthesis routes will provide cost-effective and efficient options for capturing, converting and storing solar energy.

目前，人类对物质复杂形式的认识和掌控都在经历巨大的变革。各种实体（分子、病毒、胶质、纳米晶体，等等）组成了复杂的系统（有机的、无机的和杂合的）。在实践和/或空间范围内大规模自行组合，这些实体间的相互作用形成了新的属性。新的纳米结构材料和化学合成路径将为太阳能的捕获、转化和储存提供经济高效的选择。

With new nanotechnology, materials can be designed and produced in a controlled manner and with great precision. Using simulations and multi-scale modeling, more insight can be gained into the behavior of materials from the atomic level to macroscopic scales. These insights should allow the industry to selectively control the desired properties of materials.

新的纳米技术能够可控地设计和生产出高度精密的材料。利用模拟和多尺度模型，从原子层面到宏观规模的材料表现行为都可以更多地被洞察。这些深度认识是的产业界能够有选择地控制材料所需的属性。

With the help of self-assembly, metals and molecules can be coupled to surfaces to make new high-performance materials, such as meta-materials, self-healing coatings, extremely strong textiles, composites of ultra-light materials, and two- and three-dimensional structures with novel electronic properties.
通过自组装，金属和分子可以被结合到表面做成新的高性能材料，例如超材料，自我修复涂层，极强纺织品，超轻材料复合物，新电子属性二维和三维结构。

The ability to design functional properties of materials can be used to develop new 'smart' devices. Also, with the advent of flexible and foldable surface materials (e.g. solar foil) with luminescent or light-sensitive properties a wide range of new applications is within reach. The development of advanced biodegradable and bio-based materials with specific properties is another challenge to address. Innovations in the field of materials will make the industry less dependent on scarce chemical elements.
设计功能性质材料的能力可用来研发新"智能"装置。随着灵活可折叠的具有发光或光敏属性的表面材料（如太阳能箔）的面世，广泛的新用途可在其范围内被开拓出来。先进的生物降解和具有特殊属性的生物基材料是另一个等待应对的挑战。
在材料领域的创新可让产业界减少对稀有化学元素的依赖。

Focus of the programme 联合资助计划聚焦
This NWO-GDST programme is open to joint Sino-Dutch research projects that address one of the challenges mentioned above and welcomes projects that aim to contribute to the solution of problems underlying the Energy Challenge. The programme invites Sino-Dutch consortiums to submit project proposals that focus on **organic, inorganic and/or polymeric materials and composites** and/or **their application**. The emphasis should be on research into the innovative application of materials or the application of innovative materials.
本荷兰科学研究组织-中国国家自然科学基金计划面向应对以上所述挑战内容的中荷联合研究项目开放，同时也欢迎致力于解决能源挑战根本性问题的相关技术研究的项目来申报。本计划征集联合研究团队提交聚焦于**有机、无机和/或聚合物材料和复合材料**和/或**其应用**研究的项目。在项目研究中必须对这些材料本身或其应用或者两者均具有创新性。

Innovation in organic, inorganic, and/or polymeric materials and composites
有机、无机和/或聚合物材料和复合材料的创新
Sources of inspiration: properties and structures, including fundamental insights and general principles; 'smart' materials (e.g. self-healing and responsive materials); materials of high strength; biodegradable materials.
灵感来源：属性与结构，包括基础性认识和一般规律；"智能"材料（如自我修复和反应材料）；高强度材料；生物可降解材料。

Innovation in sustainability through the application of organic, inorganic and/or polymeric materials and composites
通过应用有机、无机和/或聚合物材料和复合材料的在持续性上的创新
Sources of inspiration: substitution, reduction and recycling of (e.g.) rare earth metals, precious metals, phosphorus as well as waste polymer materials; less polluting and/or less poisonous materials; new materials from abundantly available feed stock; materials to improve energy management, storage and/or conversion.
灵感来源：替代，减少或循环使用（如）稀土金属，贵金属，磷和废气聚合物材料；减少污染和/或减少毒性材料；源自充足存量原料的新材料；改善能源管理，储存和/或转化的材料。

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