

# NISE Network Translation Process Guide

*for Educational Experiences in Museums*



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[www.nisenet.org](http://www.nisenet.org)

## What does nano mean for us?

**Nanotechnology will affect our economy, environment, and personal lives.**

Some scientists think that new nanotechnologies could transform our lives just as much as the automobile or personal computer!

As individuals and communities, we'll need to balance the costs, risks, and benefits of nanotechnologies. By deciding whether to use products made with nanotechnology, you help shape nano research and development. Companies and governments also shape our nano future, by deciding which technologies to invest in and how to regulate them.

How can we prepare for a future that includes nano?

## ¿Qué significa nano para nosotros?

**La nanotecnología afectará nuestra economía, el medio ambiente y nuestras vidas.**

¡Algunos científicos piensan que las nuevas nanotecnologías pueden transformar nuestras vidas tanto como los automóviles o las computadoras!

Como individuos y como comunidad, necesitaremos equilibrar los costos, los riesgos y los beneficios de las nanotecnologías. Cuando decides utilizar productos fabricados con nanotecnología tú contribuyes a perfilar su investigación y desarrollo. Las compañías y los gobiernos también moldean nuestro nano futuro cuando deciden en qué tecnologías invertir y cómo regularlas.

¿Cómo podemos prepararnos para un futuro que incluya nano?





The Nanoscale Informal Science Education Network (NISE Net) is a national community of researchers and informal science educators dedicated to fostering public awareness, engagement, and understanding of nanoscale science, engineering, and technology.



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## About the Guide

The NISE Network is committed to creating educational experiences that are inclusive of broad public audiences, including Spanish-speaking audiences in the United States. Many of our educational products are available in both English and Spanish, including NanoDays activities, exhibits, videos, and our public website.

The Inclusive Audiences group of the NISE Network created the Translation Process Guide to support the Network's general goal of broadening access of products and resources to underserved audiences. This guide was especially created with the intent of increasing capacity to reach audiences who do not speak English as their first language, including Spanish-speaking Hispanics/Latinos. Although this guide focuses on English to Spanish translation processes, the practices in this document reflect best practices in translation in general and are applicable to other languages as well.



## *Bilingual Audiences*

Hispanics and Latinos comprise the second largest ethnic group in the United States and have accounted for 56% of all population growth in the U.S. from 2000 through 2010 (Pew Research Center 2011). In the publication *Museums & Society 2034* (2010), the Center for the Future of Museums of the American Association of Museums suggests that providing bilingual access to information makes visitors feel welcome and fosters a sense that they belong in institutions. The NISE Network acknowledges the growing Hispanic/Latino audience and the need to provide supporting bilingual materials as part of their informal science education experience in our partner organizations.

Given the importance of making bilingual materials available to Spanish-speaking audiences, the Inclusive Audiences team—together with the Network’s educational product development groups—is committed to making a representative set of NISE Network educational experiences available in Spanish. The Inclusive Audiences translation team selected a group of educational products to translate based on input from program developers, Network partners, and other stakeholders. These educational products include bilingual exhibitions, NanoDays activities, educational programs, media, and deliberative forums.

In 2010, our decisions about which offerings to translate were supported by the NISE Network Delivery and Reach Study, where 43% of Network partner respondents reported interest in Spanish-language resources. Respondents felt that of the existing Network products, the exhibits and displays were of highest priority to be made bilingual, followed by programs, demonstrations, and classroom activities (Pattison, Benne, and LeComte-Hinely 2011).



## *The NISE Network*

The Nanoscale Informal Science Education Network (NISE Net) is a national community of researchers and informal science educators dedicated to fostering public awareness, engagement, and understanding of nanoscale science, engineering, and technology (nano). The goals of NISE Net are to create a national community of partners to engage the public in nano, to develop and distribute educational experiences that raise public awareness and understanding of nano, and to generate knowledge about public and professional learning through evaluation and research.

The NISE Net online catalog [www.nisenet.org/catalog](http://www.nisenet.org/catalog) includes over 100 educational products designed to engage the public in museums and other informal education contexts. These educational experiences include programs (presentations, demonstrations, hands-on activities, and theater), media products (including films, videos, graphics, and multimedia experiences), and exhibits. The catalog also includes dozens of tools, guides, and other resources for professionals.

The Network develops our educational products collaboratively, taking advantage of the talents of educators and experts from science museums and research institutions across the country. Our development process includes peer review by educators, prototyping and testing with the target audience, and review by scientists and other experts.



# Translation Process

This guide is intended to help you navigate through the process of creating quality translated educational products. It includes a suggested process model that will help to ensure that your translations maintain an appropriate interpretive tone and a high level of scientific accuracy. Additionally, you will find helpful tips and considerations that will assist you in planning for translation work in terms of timeline, budget, and human resource requirements.

All NISE Network exhibits, programs, videos, and other products are originally developed in English using a rigorous process that includes visitor evaluation, peer review, scientist/expert content review, and professional proofreading. The English-language versions are then translated to Spanish, edited by a professional language review firm, reviewed by native Spanish-speaking science content advisors, and in some cases evaluated with Spanish-speaking members of the general public.

## NISE Network Translation Model

### 1. Original Spanish Translation from Final English Copy

The first step in the translation process is to create an original Spanish translation of the final English copy. Whether your translation is done by a staff member or an outside translation company, it should be the goal of your translator to preserve concepts, wording, and tone of the writing as closely to the English as possible. You will want to ensure that the translation is being done in a dialect and with cultural aspects appropriate for your target audience.

You will need to decide whether to create a direct translation (side-by-side, the English and Spanish are equivalent in wording) or a translation that preserves the concepts as accurately as possible (side-by-side, the English and Spanish wording may be slightly different, but concepts are equivalent). For NISE Network projects, we use concept translation because it allows us to keep English and Spanish copy more equal in length on bilingual copy panels and to keep complex messages clearer for public audiences.

### 2. Professional Language Review

The role of the professional language review (copyediting) is to assess for grammar, spelling, punctuation, style, and appropriate wording and also to make sure that the language is broadly accessible to diverse Spanish speakers. In order to assist in this part of the process, we have created some basic guidelines outlined in the third section of this document, the “NISE Network Spanish Style Guide.” Unless your institution has internal professional-level Spanish editing capabilities, you should use a professional translation company for this part of the process.

### 3. Spanish Science Content Review

In order to ensure accuracy and clarity of translated scientific concepts, we recommend having all translations reviewed by science content advisors who are native Spanish speakers. Ideally, you might have two or three reviewers who practice in different Spanish-speaking regions or countries to review the content. Translations of scientific terminology, especially for emerging disciplines like nanotechnology, are not always clear or available in dictionaries, so feedback from these scientists is especially important. Steps two and three can be somewhat interchangeable, but in our experience, facilitating copyediting first allows our science content reviewers to really focus on the scientific accuracy of content messages and not get distracted by grammatical inconsistencies.

### 4. Evaluation and Remediation (Recommended)

In some circumstances, your team may choose to evaluate Spanish-language materials to improve a product’s relevancy for target audiences or to assess overall effectiveness of an approach with target audiences. If you’re considering an evaluation of Spanish-language products, be aware that it will require Spanish evaluation instruments and Spanish-speaking data collectors. To preserve the integrity of findings, all data analysis will need to be conducted in the original language. As with all educational products, keep in mind that you will need to budget adequate time and money to remediate Spanish-language and bilingual materials as necessary. In order to incorporate

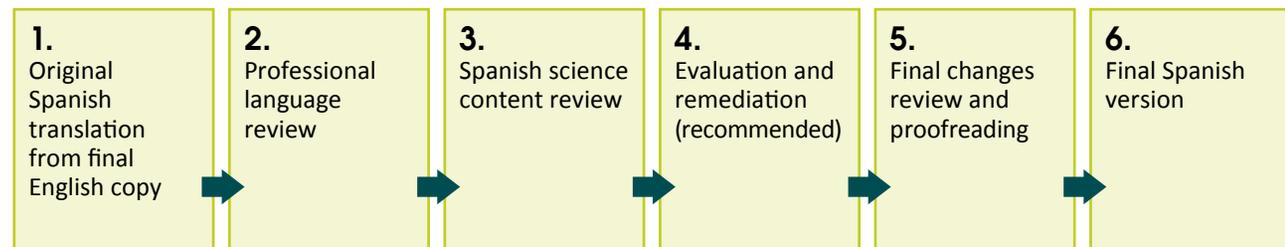


Fig 1. Translation Process

findings into any necessary remediation, it may make sense to evaluate the English and Spanish language versions concurrently for bilingual products. Examples of evaluation reports from bilingual projects are available at [www.nisenet.org/catalog/eval](http://www.nisenet.org/catalog/eval).

### 5-6. Final Changes Review and Proofreading, Final Spanish Version

Throughout the process, you will have received edits and recommended changes from your professional language review, science content review, remediation efforts, and others. The translator should review all suggested changes and decide which ones to incorporate as they proceed through the steps of the process. If there are any questions that emerge regarding changes, there may be some back-and-forth conversation between the language reviewers, science content advisors, the English developer, and the translator. Once all changes are completed, the Spanish copy is inserted into graphic files.

At this point, it's important to conduct one final proofreading check, where a minimum of three native Spanish speakers review the material before it is published. This review is intended as a final check on grammar, punctuation, wording, and spelling, and also to catch cut-and-paste errors and other glitches that may have been introduced during the final changes and formatting part of the process.

## Useful Tips and Other Considerations

### More than “Just Hiring a Translator”

Producing translated materials for your visitors can go a long way toward reaching out to underserved audiences; however, it is important that your organization understands that there is a significant level of effort and complexity involved in creating and implementing translations that achieve the same high level of quality

as the English versions. Creating translated materials will likely involve a translator, content advisors, graphic designers, copy editors, and others—and it will take a significant amount of time.

### Choosing a Translator

Whether you are searching for a translator within your organization or hiring externally, consider the following criteria:

#### ESSENTIAL

- Advanced understanding of written and spoken Spanish
- Advanced understanding of written and spoken English
- Flexibility and availability to make iterative changes, up to the last minute
- Ability to research and answer questions independently

#### PREFERABLE

- Native Spanish speaker

#### DESIRABLE

- Familiarity with local Spanish-speaking audience
- Familiarity with the topic being translated
- Experience communicating with the public

Fig 2. Criteria for choosing a translator

Translators can be found through traditional employment mechanisms, but it may also be beneficial to reach out to local Spanish-speaking community members by contacting the Hispanic chamber of commerce, local ethnic media, university language programs, and other community- or faith-based organizations to let them know you are seeking applicants for this position.

Some professional translation companies have staff members with diverse areas of expertise and with public audience communication skills. However, it may be good to ask about their areas of expertise, as some companies primarily provide translation for technical and legal documents, rather than for a general audience. Being open with the company about the expertise that your particular project requires is important. For some projects, it will be better to have a translator who is experienced in interpretive or educational writing than in technical or academic science writing, for example.

Another consideration you may find helpful when selecting a translation company or staff is their long-term availability to participate in multiple projects. It can often be helpful to have the same translator working on similar projects, so that they have some historical knowledge of the project and special vocabulary that might be particularly relevant, and so that they can get to know project staff and employees.

Your translator should be comfortable working as an intermediary among many people, including the project manager, English copywriter, Spanish science content reviewers, and proofers, and should be a detail-oriented worker. The translator will likely need to manage many files, and multiple versions, so computer and organizational skills are also important.

### Choosing Spanish Science Content Reviewers

NISE Network Spanish-speaking science content reviewers have graciously been willing to donate their time to review our translated work. Contacts in the Network have suggested potential reviewers from universities and industry who are native or fluent Spanish speakers. To find bilingual resources within the Network, you can directly contact the Inclusive Audiences workgroup. Contact

information can be found at [http://www.nisenet.org/inclusive\\_audiences](http://www.nisenet.org/inclusive_audiences).

When you are searching for a Spanish-speaking content advisor, consider the following criteria:

You may want to specify that the role of the science advisor is to ensure that the translated content accurately reflects the scientific concepts and not to be a grammatical copy editor. We generally contact our content advisors several weeks in advance of giving them content to review and then allow a minimum of two weeks for them to review and provide tracked changes.

### Choosing Professional Language Reviewers

#### ESSENTIAL

- Advanced understanding of written and spoken Spanish
- Advanced understanding of written and spoken English
- Expertise with the topic being translated
- Understanding of familiar topic-related terminology

#### PREFERABLE

- Native Spanish speaker

*Fig 3. Criteria for choosing a content reviewer*

It is important that your language reviewer is not the same individual who did the original translation work. If you have hired a translation company, they will likely be able to do the final copyediting in-house. All Spanish translated materials for the NISE Network have been copyedited and proofed by the International Language Bank, a service provided by the Immigrant and Refugee Community Organization in Portland, Oregon ([www.irco.org](http://www.irco.org)).

## Translation Workflow

When conducting the original translation, it can be helpful to work in a two-column document, with English on one side and Spanish on the other. By working in this format, your translator can monitor paragraph length as the work progresses, and your reviewers can ensure that the content messages and tone are being preserved from the original English. Be sure to establish a system to keep track of your most current versions, for example, by keeping the date of the most recent changes at the top of each column.

After your translator has incorporated all reviews and edits into this side-by-side grid, you will be ready to copy and paste the Spanish from this document into your final formatted graphic files. This last step introduces the potential for error into the final product (e.g., copying and pasting the wrong paragraph, accidentally cutting off parts of sentences), so you will need to make sure that several Spanish speakers review the final formatted product before it is published.

For bilingual products, where English and Spanish will both be presented on the same product, it can be beneficial to have some

flexibility in the final English copy and layout as you are working on translations. For example, since Spanish copy is often longer than the same copy in English, some flexibility in the English copy/layout may allow you to more easily address layout concerns.

## Translation Is an Iterative Process

As is true for developing many types of educational products, creating translated materials is an iterative process. It may take several back-and-forth attempts between the English copywriter, translator, and designer to achieve optimal wording and layout for bilingual materials. While going through the steps outlined in the Translation Process, it is important that documents be updated to incorporate each round of feedback.

## Note on Translation Software

Google Translate and other automated translation programs may be of help in the creation of bilingual/Spanish materials—particularly in estimating the length of text for graphic panel or document layout—but they are not an appropriate replacement for using a professional translator because they do a poor job of catching language nuance and do not preserve concepts well. If your team decides to use automated translations for layout placeholders, be sure to label it as such (“Spanish currently being developed” or “placeholder text”) so the public knows that it will not be used in the final product.

## Time and Money Requirements

The minimum amount of time that we recommend to complete the translation process for any size job is one month. Very small projects take at least a month to go through the process, but large projects (graphic panels for an exhibit, for example) may take closer

English Final Copy <i>(date of most recent version)</i>	Spanish Copy <i>(date of most recent version)</i>
How is this nano?	¿Por qué es nanotecnología?
Scientists use special tools and equipment to work on the nanoscale. Nanoscale science focuses on things that are measured in nanometers, including atoms and molecules, the basic building blocks of our world.	Los científicos usan herramientas y equipos especiales para trabajar en la nanoescala. La ciencia a escala nano se enfoca en las cosas que se miden en nanómetros, incluyendo átomos y moléculas, las estructuras básicas que construyen a nuestro mundo.

Fig 4. Translation document two-column setup

to six months. Your timeline should account for preparing files for translation, translating English copy, professional language review, science content review, remediation, and final revisions and reviews. Additional time may be required for projects where graphic design is involved or if Spanish-language evaluation is desired.

For your professional language review, the cost will depend on the size and complexity of the job. To estimate cost, most translation companies will request a word count in either English or Spanish. There is typically a minimum fee for small projects, and the per-word cost may be slightly less for very large projects. It typically costs in the low hundreds of dollars for a small proofing job, up to around a thousand dollars for a larger job.

### **Alternative Models for Producing Spanish-Language Materials**

The translation model suggested in this document is just one model for developing Spanish-language educational materials. Other institutions use a co-development model where all original English and Spanish content are developed concurrently. In this model, content research, brainstorming, advisor feedback, and evaluation are conducted in Spanish as well as English. The co-development model is more expensive and takes more time, but this model makes it easier to ensure that all content is relevant for both audiences and also allows the English and Spanish copy to inform each other during development. For more information on the co-development model, you can contact the Exhibit Research and Development Division at the Oregon Museum of Science and Industry at 503.797.4000.





## NISE Network Spanish Style Guide

The NISE Network communicates with the public via exhibits, programs, media experiences, website pages, and a variety of other printed and electronic materials. The goal of this style guide is to promote clarity and consistency in the various materials we produce.

This style guide is to be used as a reference and starting point for NISE Network translated and bilingual English-Spanish projects. NISE Network educational products that follow this guide include (but are not limited to) exhibits, educational programs, NanoDays activities, electronic interfaces, websites, videos, audio recordings, and print media such as posters.

## General Spanish Language Guidelines

The following section presents general Spanish language guidelines for NISE Network educational and marketing products.

### Use of Formal and Informal Spanish

#### *Exhibits, Programming, and Marketing*

NISE Net uses informal Spanish to establish a communication that's open, fresh, and friendly in our exhibits, programming, educational materials, and marketing efforts.

### Explorando estructuras: las bolas de Bucky

#### **¡Intenta esto!**

1. Toma una figura de papel pre-cortada.
2. Dobla el papel siguiendo las líneas punteadas para armar el modelo de una estructura a escala nano.
3. Coloca las lengüetas en las ranuras para armar la estructura  
¿Cómo se ve tu modelo?



#### **¿Qué sucede?**

*Informal Spanish is used in NanoDays activities*

### *Other Communications in Spanish*

For any other type of bilingual communication, the particular situation should be assessed in order to determine whether formal or informal Spanish is appropriate. Some criteria to be considered in this decision may include country of origin, age of target audience, formality of the event, and/or audience language preference.

### Use of “Neutral” Spanish

To avoid any misinterpretations or confusion by the general Spanish-speaking U.S. Hispanic/Latino community, it is suggested that “Neutral Spanish” be used. This means using Spanish that does not contain references, words, phrases, or dialects (e.g., using *ustedes* vs. *vosotros*) that are regionally or culturally specific, unless it is required.

As a general guide, NISE Net should aim for internationally (not only regionally) acceptable Spanish, similar to what is currently broadcast on major international television networks such as Univisión or Telemundo or CNN Español (National Park Service 2010). Syndicated television programming in Latin America is dubbed in Neutral Spanish to avoid idioms and words that may have a coarse or questionable meaning in some regions or countries.

The diversity among the Spanish-speaking population includes not only demographics but also home country regional differences that may influence the complex patterns of how individuals understand and perceive U.S. cultural practices. This diversity of Spanish speakers becomes an essential consideration when translating material from English to Spanish to make it accessible by our diverse Hispanic/Latino populations.

## Reading Level

The Spanish reading level should be consistent with the English reading level when co-developing or translating, and whenever Spanish and English materials are presented in the same space, context, or campaign. Materials exclusively in Spanish (i.e., not accompanied by English) that are to be developed for an exhibit or a program should use the target audience’s linguistic characteristics and preferences as the main criteria for establishing the appropriate reading level. This process will ensure that Spanish language communications will accurately represent content and maintain basic standards with respect to academic, technical, and scientific terminology.

## Translation of Institutional Names

It is recommended that business and any other institutional names remain in their original English form unless a translated name is provided by the organization.

<i>Institution</i>	<b>Recommended</b>	<b>Not Recommended</b>
<b>ASTC</b>	Association of Science-Technology Centers	<del>Asociación de Centros de Ciencia-Tecnológica</del>
<b>NSF</b>	National Science Foundation	<del>Fundación Nacional de Ciencia</del>
<b>U.S. Department of Education</b>	Departamento de Educación de Los Estados Unidos*	<del>U.S. Department of Education</del>

\*As specified on the U.S. Department of Education’s website

## Recognized Reference Books

NISE Network recognizes the Diccionario de la lengua Española as its official reference guide for Spanish translation. See:

[www.rae.es/rae.html](http://www.rae.es/rae.html)

## NISE Network-Specific Terminology

The following section focuses on Spanish language tips and considerations that are specific to communicating with public audiences about nanoscience and the NISE Network.

### Translating the Term “Billion”

The term “billion” (English) cannot be translated as “billon” (Spanish). The correct translation is “mil millones.” The word “billion (billón)” can mean different amounts in different languages.

In English, one billion is one thousand million but, in most non-English speaking countries in Europe, “billion” means one million million, which is equivalent to one trillion in English. In these languages, one billion is 1,000,000,000,000 ( $10^{12}$ ), while in English its 1,000,000,000 ( $10^9$ ). The UK now uses billion the same way Americans do, but only since 1974.

Scientific notations like “ $10^{-9}$ ” or “nanometer” are universal in their meaning and much more precise, but, as educational institutions, we often have to use multiple forms of expression to best communicate our ideas. For more information, see:

[http://en.wikipedia.org/wiki/Long\\_scale](http://en.wikipedia.org/wiki/Long_scale)



*The translation of the term billion is “mil millones” (not “billon”)*

### Referring to the NISE Network and NanoDays in Spanish

The terms “NISE Network” and “NanoDays” should not be translated, both for consistency and in order to keep them simple and easy to identify.



*NISE Network and NanoDays should appear in English only*

## Exhibition and Program Titles

### *Monolingual vs. Bilingual Products*

Monolingual products have material presented in one language (Spanish or English), whereas bilingual projects have both languages on the same product (Spanish and English). For Spanish monolingual products (e.g., curriculum activities), use only the Spanish title. However, for bilingual products (e.g., bilingual exhibit components), use both the English and Spanish titles.

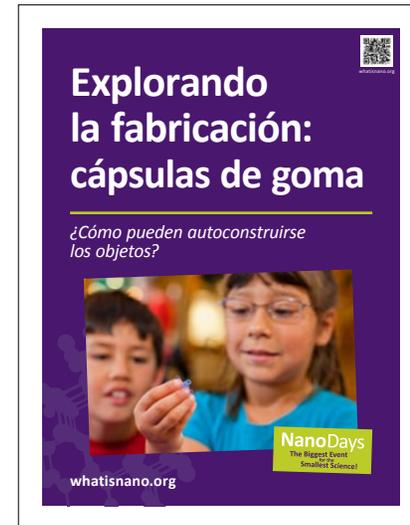
### *Symbols Indicating Spanish Content*



For NISE Network products, we chose to create our own symbol to indicate that content is available in Spanish. This symbol is used on our websites to link to Spanish content and resources, and to indicate that a particular program is being offered in Spanish. This symbol can be found at:

[www.nisenet.org/catalog/Spanish](http://www.nisenet.org/catalog/Spanish)

Other symbols that are commonly used by other organizations to indicate Spanish translation include the capital or lowercase letter “N” with a tilde (Ñ or ñ) or a graphic of a Mexican or Spanish flag. Since Spanish-speaking visitors to science centers in the U.S. may come from many different countries, we chose to avoid the flag symbol altogether.



*Monolingual products have language presented in one language only*



*Bilingual products have both English and Spanish on the same product*

## Quick Reference Guide

<b>application</b>	aplicación
<b>atom</b>	átomo
<b>atomic force microscope</b>	microscopio de potencia atómica
<b>biomimicry</b>	biomímesis
<b>bottom-up</b>	de-abajo-hacia-arriba (*)
<b>buckyballs</b>	bolas de bucky/buckyballs (**)
<b>carbon atom</b>	átomo de carbono
<b>carbon nanotube</b>	nanotubo de carbono
<b>encapsulation</b>	encapsulamiento
<b>ferrofluid</b>	ferrofluido
<b>graphene</b>	grafeno
<b>liquid crystal</b>	cristal líquido
<b>lotus effect</b>	efecto de loto
<b>macroscale</b>	macroescala
<b>microscale</b>	microescala
<b>micrometer</b>	micrómetro
<b>molecule</b>	molécula
<b>nanobot</b>	nanobot
<b>nanofiber</b>	nanofibra
<b>nanofilter</b>	nanofiltro
<b>nanomaterials</b>	nanomateriales
<b>nanometer</b>	nanómetro
<b>nanomedicine</b>	nanomedicina
<b>nanoparticle</b>	nanopartícula
<b>nanogold</b>	nano-oro
<b>nanoparticle gold</b>	nanopartícula de oro
<b>nanoparticle silver</b>	nanopartícula de plata
<b>nanosilver</b>	nanoplata
<b>nanoscale</b>	nanoescala

<b>nanoscience</b>	nanociencia
<b>nanoscientist</b>	nanocientífico
<b>nanoshells</b>	nanocascarones
<b>nanostucture</b>	nanoestructura
<b>nanosurface</b>	nanosuperficie
<b>nanotechnology</b>	nanotecnología
<b>nanotechnology-enabled</b>	activado con nanotecnología
<b>nanotubes</b>	nanotubos
<b>quantum dots</b>	puntos cuánticos
<b>quantum corral</b>	corral cuántico
<b>self-assembly</b>	autoensamble
<b>scanning probe microscope</b>	microscopio de sonda de barrido
<b>societal and ethical implications</b>	implicaciones sociales y éticas
<b>superhydrophobicity</b>	superhidrofobia
<b>superhydrophobic</b>	superhidrofóbico
<b>superparamagnetic</b>	superparamagnético
<b>superparamagnetism</b>	superparamagnetismo
<b>targeted drug delivery</b>	distribución dirigida de medicamentos
<b>thin film</b>	lámina delgada
<b>thin film solar cell</b>	película de celda solar película fotovoltaica
<b>top-down</b>	de-arriba-hacia-abajo
<b>van der Waals forces</b>	fuerzas de van der Waals

*\* Some terms on this list, like “bottom-up,” are not literal translations but an interpretation of the meaning. When terms like this one are present in a document the best resource to provide an accurate translation is a Spanish-speaking scientist.*

*\*\* The term buckyballs may be used in Spanish materials, as long as the word is explained and there are graphics/pictures that go with it. Some Spanish web pages are using the term buckyballs already.*

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