

## **The IGC award for outstanding Research and Initiatives in Green Chemistry and Engineering.**

Through The IGC award for outstanding research and initiatives in Green Chemistry and Engineering we would like to promote pollution prevention through partnerships with the chemistry community. Through high level recognition and support, the award will promote innovative developments in and uses of green chemistry for pollution prevention.

### **Awards**

The IGC award is an opportunity for individual student or professor, Research groups, Institutes, government laboratories, universities, Large scale Industries, MNC's, startup companies and small to medium scale industries to compete for awards in recognition of innovations in cleaner, cheaper, smarter chemistry. Through this award we want to provide national recognition of outstanding chemical technologies that incorporate the principles of green chemistry into chemical design, manufacture, and use, and that have been or can be utilized by industry in achieving their pollution prevention goals.

Green chemistry technologies can be categorized into one or more of the following three focus areas:

#### **1. The use of greener synthetic pathways**

This focus area involves implementing a novel, green pathway for a new chemical product. It can also involve using a novel, green pathway to redesign the synthesis of an existing chemical product. Examples include synthetic pathways that:

- Use greener feedstocks that are innocuous or renewable (e.g., biomass, natural oils).
- Use novel reagents or catalysts, including biocatalysts and microorganisms.
- Are natural processes, such as fermentation or biomimetic synthesis.
- Are atom-economical.
- Are convergent syntheses.

## 2. **The use of greener reaction conditions**

This focus area involves improving conditions other than the overall design or redesign of a synthesis. Greener analytical methods often fall within this focus area. Examples include reaction conditions that:

- Replace hazardous solvents with solvents that have a reduced impact on human health and the environment.
- Use solventless reaction conditions and solid-state reactions.
- Use novel processing methods.
- Eliminate energy- or material-intensive separation and purification steps.
- Improve energy efficiency, including reactions running closer to ambient conditions.

## 3. **The design of greener chemicals**

This focus area involves designing chemical products that are less hazardous than the products or technologies they replace. Examples include chemical products that are:

- Less toxic than current products.
- Inherently safer with regard to accident potential.
- Recyclable or biodegradable after use.
- Safer for the atmosphere (e.g., do not deplete ozone or form smog).

### **Award Categories**

The IGC award for outstanding research in Green Chemistry and Engineering will recognize four individuals and organization and award will be presented one in each of the following categories:

- Academic: An academic investigator for a technology in any of the three focus areas.
- Student : A student investigator pursuing research for their Masters Research, doctoral thesis or postdoctoral fellowship for a technology in any of the three focus areas.

- Startup and small to medium scale companies: A Technopreneurial companies, Knowledge based start ups and small to medium scale industries for a technology in any of the three focus areas.
- MNC and Large scale Industries: An established MNC or a large scale company for a technology in any of the three focus areas.

### **Award Selection Criteria**

Nominated chemistry technologies must fall within the scope of green chemistry and engineering. Technologies that meet the scope will then be judged on how well they meet the following criteria:

#### **1. Science and innovation**

The nominated chemistry technology should be innovative and of scientific merit. The technology should be, for example:

- ❖ Original (i.e., never employed before).
- ❖ Scientifically valid. That is, can the nominated technology or strategy stand up to scientific scrutiny through peer review? Does the nomination contain enough chemical detail to prove its scientific validity? Has the mechanism of action been thoroughly elucidated through sound scientific research?

#### **2. Human health and environmental benefits**

The nominated chemistry technology should offer human health and/or environmental benefits. The technology might, for example:

- ❖ Reduce toxicity (acute or chronic) or the potential for illness or injury to humans, animals, or plants.
- ❖ Reduce flammability or explosion potential.

- ❖ Reduce the use or generation of hazardous substances, the transport of hazardous substances, or releases to air, water, or land.
- ❖ Improve the use of natural resources, for example, by substituting a renewable feedstock for a petrochemical feedstock.

Quantitative statements of benefits are more useful to judges than are qualitative statements.

### 3. **Applicability**

The nominated chemistry technology should have a significant impact. The technology may be broadly applicable to many chemical processes or industries; alternatively, it may have great impact on a narrow range of chemistry. Commercial implementation can support the applicability and impact of a technology. The nominated technology should offer at least the following:

- ❖ An Innovative approach to green chemistry.
- ❖ A remedy to a real environmental or human health problem.
- ❖ One or more technical innovations that can be transferred readily to other processes, facilities, or industry sectors.

### **How to Enter the Award Competition**

The IGC award for outstanding research in Green Chemistry and Engineering is open to all individuals (academicians and students), research groups, and Universities, Government laboratories and Institutes, Startup, small to medium scale companies, large scale companies and MNC's in the India. To be eligible for the award, a nominated technology must meet the scope of the program:

- It must be green chemistry (i.e., has a significant chemistry component and is source reduction)
- It must have reached a significant milestone within the past Three years (e.g., been researched, demonstrated, implemented, applied, patented, etc.)
- It must also have a significant component within India.

Entries must be sent no later than November 15. Awards will be presented at the IGCW-2009 in December at Mumbai .

Nominated green chemistry technologies should be an example of one or more of the three focus areas. Green chemistry technologies will be judged on how well they meet the selection criteria (where applicable). One award will be made in each of the award categories.

Self-nominations are allowed and expected. There is no entry fee and no standard entry form, but nominations must meet certain requirements. Nominations must be single-spaced and no longer than eight pages with 12-point type; references, captions, and footnotes may be as small as 10-point. When printed on 8½-by-11-inch paper, they must have margins of at least 1 inch. Nominations that do not meet these requirements may be rejected . Nominations may include chemical reactions, tables, graphs, photographs, and other illustrations. Nominations must include the following:

1. A cover page with the

- a. **Project title** followed by the **date** of the nomination.

- b. **Primary sponsor(s)**: The individual or organizational owner of the technology. For academic nominations, the primary sponsor is usually the principal investigator. For nominations with more than one sponsor, each co-sponsor should have had a significant role in the research, development, or implementation of the technology.

- c. **Contact person**: The one individual with whom we should communicate regarding the nomination. For academic nominations, the contact person is usually the principal investigator.

- d. **Contributors (optional)**: Those individuals or organizations that have provided financial or technical support for development or implementation of the nominated technology.

We will add the person listed as a contact to a contact database. We periodically sends reminders and updates about the program to those in this database. Individuals may opt out at any time.

2. The second page should contain the following information:

- Project title.
- Short description of the most recent milestone(s), with date(s), that the nominated technology has reached within the past three years. One or two lines are sufficient. Examples include, but are not limited to: critical discovery made, results published, patent application submitted or approved, pilot plant constructed, and technology implemented or commercialized. Only one milestone is required.
- A sentence indicating whether the nominated technology is eligible for which category of the award.
- Identification of the focus area (or areas) that fit your technology. No explanation is needed.
- Description of the research, development, or aspects of the technology that occurred within the Indian context
- Abstract not to exceed 350 words that describes the nominated technology, the problem it addresses, and its benefits. Include the state of implementation of the technology and any quantitative benefits such as amount (or potential amount) of hazardous substances eliminated. Organizers plans to publish shortlisted abstracts in IGCW-2009 electronic publications.
- Note: An executive summary is not necessary.

The information in this section should fit on page 2, but you may continue on page 3 if necessary.

3. The remaining pages should explain in detail how the nominated technology meets the scope of the program and the selection criteria. Explain the following:

- The *chemistry* of the new technology, emphasizing how the technology is innovative and of scientific merit. Consider including chemical structure diagrams

rather than text to describe your chemistry. Patent numbers or references to peer-reviewed publications may strengthen your nomination. The judges recognize the interdisciplinary nature of green chemistry; however, to be eligible for an award, your technology must include a significant chemistry component.

- The problem (environmental or human health risk) that your technology addresses, the importance of that problem, and how your technology solves the problem.
- How your technology compares with other technologies that may address the same problem.
- The realized or potential benefits and drawbacks across all stages of your technology's lifecycle: from feedstocks to manufacture to use of the product to ultimate disposal of the product.

4. For Industrial participant also attach Company profile in approximately 300 words.

**IMPORTANT: To make the strongest presentation of your technology for the judges, you should include as much nonproprietary detail as possible in your nomination. The judges will pay close attention to the specifics of your chemistry, including detailed reaction pathways, comparisons to existing technology, toxicity data, quantities of hazardous substances reduced or eliminated, degree of implementation in commerce, and other technical, human health, environmental, and economic benefits. The judges recognize that some sponsors will not be able to conduct a full lifecycle analysis, but like to see a discussion of impacts across the lifecycle. In addition, we strongly encourage you to compare the cost, performance, and environmental profile of your technology with any competing technologies. This may help you demonstrate the broad applicability of your technology.**

It may help the judges if you address the status of any novel chemical substances or organisms under any appropriate laws especially if the technology is or is about to be commercially available.

You may include structure diagrams, tables, other graphics, and references, but all information must fit within the eight-page limit.

You may nominate more than one technology, but you must submit a separate nomination for each technology. You should probably combine multiple applications of the same general technology in a single nomination, however.

All entries received will be considered public information. No material will be returned. Program sponsors are not responsible for lost or damaged entries. We will acknowledge receipt of nominations, usually by email to the person listed as the Contact Person. If you have not received an acknowledgment by third week of November, please contact the award co-ordinator at [krishna.dave@industrialgreenchem.com](mailto:krishna.dave@industrialgreenchem.com) or (022)-28791835.

Submit an electronic copy of the nomination in such a format that we can *select and copy text from it*. Please include the primary sponsor's name in the file name. It may be to your advantage to submit your nomination as a .pdf file to minimize possible reading errors, but we will accept and be able to read all common file types. You should email the electronic copy to **[krishna.dave@industrialgreenchem.com](mailto:krishna.dave@industrialgreenchem.com)**. If you cannot send the file via email, you may send it on a CD, clearly labeled with the sponsor(s). The nomination must be sent no later than November 15.