

S8-01

**SCOPE AND LIMITATIONS OF SUSTAINABILITY METRICS  
FOR PRODUCTS AND PROCESSES**

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We cannot really know what we cannot measure. If we accept the notion that sustainable development is the journey to the goal that is sustainability, it is imperative that we develop metrics to be able to measure how much progress made from the present state, and how much farther to go for attaining the goal. Such measurement enables us to chart our course and devise strategies. The number and kind of metrics needed for measuring progress, however, depends on the choice of systems. A large number of sustainability indicators or metrics have been proposed, but it is still an embryonic field largely devoid of rigorous scientific analyses.

S8-02

**From Vision to Measurement**

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This conference is titled “Green and sustainable chemistry”. In publications and during this conference there is an intensive discussion around this topic. Is it one topic? – Is the meaning of green and sustainable the same? On the Internet page of US Environmental Protection Agency EPA I read their Green Chemistry Mission:

“to promote innovative chemical technologies that reduce or eliminate the use or generation of hazardous substances in the design, manufacture and use of chemical products”.

Many publications, discussions and the just mentioned Internet page give the impression that green and sustainable chemistry is the same. But the equation green = sustainable is misleading. Sustainability is more than ecology. It does not only include ecological aspects, but also economical and social aspects.

S8-03

**Introduction and Evaluation of GSC Related R & D Projects in AIST**

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AIST aims to develop innovative technologies related to GSC, which can respond to reducing energy or GHGs emission, resources, wastes and pollutants as well as risks due to hazardous chemicals. Several research projects under AIST program are introduced and qualitative evaluation of them is briefly mentioned.

S8-04

**Green Chemistry: How do we measure success?**

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Research can be viewed as a system, and system performance can be measured with input, in-process, output, and outcome metrics. For green chemistry, input metrics might include the number of students studying green chemistry, or the amount of grants in green chemistry; in-process metrics might include the number of green chemistry principles being applied, or the number of environmental problems being attacked; output metrics might include the number of papers published, or nominations for various Green Chemistry Awards; outcome metrics could include the number of green products or processes commercialized, or specific benefits of these products and processes.

S8-05

**Metrics to "Green" Chemistry – selection and use**

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**Metrics are essential for a variety of reasons.** They help scientists understand issues and opportunities, enable benchmarking, and allow improvement targets to be set. Ultimately they can be used to measure changes in behaviour, deliver competitive advantage and help drive business, government and communities to more sustainable practices. They also provide a framework for the development of guidance and simple (but not simplistic) decision making tools.

S8-06

**Green and Sustainable Indices for  
the Evaluation Process of GSC Awards in Japan**

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Criteria used to evaluate Japanese GSC Award will be described. Three kinds of criteria were defined and used for the evaluation, including one to express minimization of the use of hazardous substances, one to formulate sustainable aspects of products or systems, and one to describe contribution of public communication activities.