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Shi Han

《产业生态学报》
1997 年冬，第 1 卷第 4 期，13–18 页

题目：火星、材料和三个寓言：材料流与环境政策

作者：David Rejeski

关键字：产业生态学应用，环境政策改革，产业生态系统，物流，减少毒物使用

摘要：虽然产业生态学代表了一个吸引人的类比，并具有丰富的分析方法，但是它对环境政策的影响却十分有限。本文分析了针对美国经济中三种基本材料——铅、砷和银的研究所提供的启示，以及这类研究对于分析发现未来环境政策所面临的一些重大、隐含挑战的能力。本文重点讨论了三个具体挑战：跨国界材料流，不断增长的产品内含排放，以及对材料流驱动力假设不加验证的危险。本文指出产业生态学能够为公共政策提供帮助，但是现在是产业生态学实践者将这门应用科学应用到经常处于混乱状态的环境决策过程中去的时候了。

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Mars, Materials, and Three Morality Plays

David Rejeski

Keywords:
applications of industrial ecology, environmental policy reform, industrial ecosystems, materials flows, toxic use reduction

Summary:
Although industrial ecology represents a captivating metaphor and rich repertoire of analytical tools, its impact on environmental policy has been marginal at best. This article examines the insights provided by the studies of three common materials in the U.S. economy - lead, arsenic, and silver - and the ability of such studies to illuminate some larger and looming challenges for future environmental policy. Three specific challenges are explored: the flow of materials across national borders, the increasing embodiment of emissions in products, and the dangers of unchallenged assumptions about the drivers of material flows. The article argues that industrial ecology can inform public policy but that it is time for the practitioners of industrial ecology, an applied science, to apply it in the often messy world of environmental policymaking.

《产业生态学报》

1997 年冬，第 1 卷第 4 期，35-55 页

题目：一种针对产品面向环境的设计的过程链方法

作者：Paul Sheng, Paul Worhach

关键字：面向环境的设计，考虑环境因素的制造，健康危害评分，印刷电路板，过程链，权重系数因素

摘要：本文介绍了一个通过将环境危害分析和转化过程模型加以结合，对产品开展面向环境的设计的方法。作为生命周期评价（LCA）的一个辅助分析工具，整个方法通过对作为产品生命周期的一个组成部分的“过程链”建模而辅助开展具体的设计决策。这种方法的主要模块是一系列能够利用过程和设计参数来估计能量消耗、生产废物和辅助废物流的单元过程模型。这些环境排放的数量可以通过一个多准则环境危害评价方法来分析其整体影响。最后，废物信息可以用来支持一个能够把设计参数同材料、过程和操作参数选择联系起来的设计模型。我们通过一个印刷电路板（PCB）组装的案例分析来阐述过程链在生产过程中的实施。

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A Process Chaining Approach Towards Product Design for Environment

Paul Sheng and Paul Worhach

Keywords:
design for environment, environmentally conscious manufacturing, health hazard score, printed circuit boards, process chaining, weighting factors

Summary:
This article presents an approach toward product design for environment (DfE) at the level that integrates environmental hazard analysis with models of transformation processes. As a complementary analysis tool to life-cycle assessment (LCA), this method would support detailed design decisions through modeling of a "process chain" for a subset of the product's life cycle. The building blocks for this approach are a set of unit process models that can convert process and design parameters into estimates for energy utilization, production scrap, and ancillary waste flows. These values for quantity of environmental releases can be integrated using a multicriteria environmental hazard evaluation methodology that can estimate the "quality" of environmental releases. Finally, the waste information can be used to support a design model that can link design parameters to material, process, and operational parameter selection. A case study illustrating printed circuit board (PCB) assembly is presented to show process chain implementation in manufacturing applications.

《产业生态学报》
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题目：服务业的生命周期评价

作者：Thomas E. Graedel

关键字：汽车维修，非物质化，生命周期评价，矩阵评价，服务业，简化生命周期评价

摘要：虽然服务业在现代社会中扮演了主导作用，但是这个行业基本上还没有投入到创造为环境负责的运作的巨大努力中去。导致这种局面一定程度上是因为人们没有充分认识这个行业作为影响资源流动的主要推动力的作用。也许更重要的是，还没有建立一个用来评估服务业环境责任的基本机制。本文就提供了一个这样的机制，并将其应用到一个基本服务业：汽车维修。我们得到的结论是不同种类的服务业应该采取不同的评估方法，并且由于服务业使用建筑物和设备的方式不同，就要求使用新型解决方案，而不是一般所提倡的“绿色”制造的运作方式。

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Life Cycle Assessment in the Service Industries

Thomas E. Graedel

Keywords:
automotive repair, dematerialization, life-cycle assessment, matrix assessment, service industries, streamlined life-cycle assessment

Summary:
Despite the dominant role service industries play in modern society, those industries have by and large not been involved in the strong efforts underway to create environmentally responsible operations. Part of the reason is that the role of these industries as driving factors in resource flows has not been recognized. Perhaps more important, no common framework for assessing the environmental responsibility of service industries has been established. This article provides such a framework and applies it to a generic service industry: automotive repair. Among the results are that evaluation must take different forms for different types of services, and that the approaches of service industries to the use of buildings and equipment will require innovative solutions quite unlike those advocated for the "greening" of manufacturing operations.

《产业生态学报》
1997 年冬，第 1 卷第 4 期，71-91 页

题目：制冷用 CFC 以及 CFC 替代物的生命周期全球变暖效应

作者：Stella Papasavva, William R. Moomaw

关键字：CFCs，全球变暖，生命周期影响评价（LCIA），制冷物质核算，物质流分析

摘要：我们已经采用基于生命周期的方法对制冷用 CFC-11, CFC-12 及其替代物 HCFC－123 和 HFC134a 的全球变暖潜力进行了分析。我们还通过将上述各种化合物生产的全球变暖潜值（GWP）、再循环的 GWP 及其大气分解物的 GWP 相加，发展了包括直接 GWP 和间接 GWP 在内的总全球变暖影响当量（TEWI）的定义。我们发现有化合物生产导致的 GWP 对生命周期全球变暖影响 (LCWI)的贡献不到 1%，而且间接 GWP 很大程度上取决于制冷效率和生产制冷所消耗电力的一次能源结构。此外，大气分解物的 GWP 对 LCWI 也有很大的影响。

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Life-Cycle Global Warming Impacts of CFCs and CFC-substitutes for Refrigeration

Stella Papasavva and William R. Moomaw

Keywords:
CFCs, global warming, life-cycle impact assessment, materials accounting refrigeration, substance flow analysis

Summary:
We have investigated the global warming potential (GWP) of CFC-11, CFC-12, and their replacements, HCFC-123 and HFC-134a, based on a life-cycle methodology for refrigeration. We have extended the definition of the total equivalent warming impact (TEWI), which considers the GWP (direct) and GWP (indirect) warming potential of each chemical compound, by adding the GWP (chemical production), GWP (recycling), and GWP (atmospheric breakdown products) for each chemical. We find that the GWP (chemical production) contributes by no more than 1% to LCWI, and that the GWP (indirect) is highly dependent on refrigerator efficiency and the fuel mix of the electricity source used to operate the appliance. The GWP (atmospheric breakdown products) may also have a significant impact on LCWI.

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题目：衡量企业的环境表现：ICI 环境负荷系统

作者：Michael Wright, David Allen, Roland Clift, Hein Sas

关键字：化工生产，企业环境报告，环境影响评价，环境指标，环境影响类型，权重因子

摘要：ICI 集团开发了一种被称为“环境负荷系统”的方法，来评价其污染排放和废物的潜在环境影响。这个方法使用权重系数对十大类废物和污染排放的潜在环境影响进行评价。与传统的污染排放和废物总量的报告方法相比，环境负荷系统的方法为排放的潜在影响给予一个更加形象的描述；它能够帮助识别最有害的废物和排放；它能帮助公众更好地了解公司运作的潜在影响；它还帮助宣传减少废物和排放项目的有效性。

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Measuring the Corporate Environmental Performance: The ICI Environmental Burden System

Michael Wright, David Allen, Roland Clift and Hein Sas

Keywords:
chemical manufacturing, corporate environmental reporting, environmental impact assessment, environmental metrics, impact categories, weighting factors

Summary:
The Imperial Chemical Industries (ICI) group has developed a method, called the "environmental burden system," to rank the potential environmental impacts of its emissions and wastes. The method uses potency factors to characterize the potential environmental impacts of wastes and emissions in ten major impact categories. When compared to the more traditional approach of reporting the total mass of emissions and wastes, the environmental burden approach provides a more meaningful picture of the potential impact of emissions; it helps identify the most harmful wastes and emissions; it provides the public with a better understanding of the potential impact of company operations; and it helps communicate the effectiveness of waste and emission reduction programs.