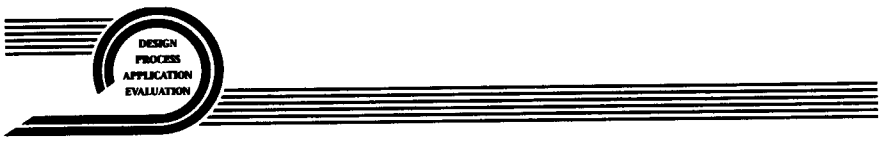
proportions and mixes an accurately metered amount of air and gas to produce an atmosphere that is approximately 50% less expensive than a nitrogen-based atmosphere. The resulting output gas composition is 50% hydrogen, 20% carbon monoxide, 0.5 hydrocarbon, and the balance nitrogen. For more information, contact Lindberg, A Unit of General Signal, 304 Hart Street, Watertown, WI 53904; tel: 800/873-4468; fax: 414/261-4962.

Lindberg Furnaces and Ovens, Asheville, N.C., a General Signal company, has published a new 28-page color brochure which details the company's board selection of laboratory furnaces, ovens, and power controllers. Lindberg furnaces range in operating temperatures from 1100 to 1800 °C. Described in easy to read quick-reference charts, the Lindberg oven line includes Moldatherm™ and LGO® Series box furnaces, general purpose box furnaces, single zone and three zone tube furnaces, split-hinge tube furnaces, the adapters, and crucible furnaces. ***Designed for a wide range of research and industrial applications,*** the Lindberg laboratory oven line include 343 °C high performance mechanical ovens, 300 °C mechanical convection ovens; 250 °C clean room ovens (mechanical convection); 260 °C gravity convection ovens; and 260 °C vacuum ovens. For a copy of the catalog, contact Lindberg, A general Signal Company, 275 Aiken Road, Asheville, NC 28804; tel: 800/509-1625; fax: 704/645-5916.



Environment

In the effort to preserve and maintain the fragile ecology of our planet, these recently selected abstracts are presented to help readers of Journals of Materials Engineering and Performance stay current on legislation and compliance with global environmental issues and regulations. They are reprinted from Metals Abstracts and Materials Business File with permission from Materials Information, a joint service of ASM International®, Materials Park, Ohio, and the Institute of Materials, London, England.

US Ferroalloy Makers Find Costs to Clean Up Emissions Very High. Chromium, manganese, and nickel are the three metals of highest concern to the US Environmental Protection Agency regarding hazardous air emissions for ferroalloys production facilities. Compared with other industries, ferroalloys producers do not emit enough hazardous air pollutants to be considered alarming. Nevertheless, representatives from the domestic ferroalloys industry and the EPA are working together on national emission standards for hazardous air pollutants (Neshaps). By early 1995, the EPA should propose federal regulations concerning environmental controls on ferroalloys production.

L.M. Cohn. Cited: *Am. Met. Mark.*, Vol 102 (No. 2), 4 Jan 1994, p 7 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199401-S4-0005.

[US] Pollution Regs Seen Prompting Steelmaking Technology Shift. Stricter environmental regulations may cause US steelmakers to change production processes to avoid increasing costs and to comply with new environmental regulations, according to a recent report. The report, put together by the International Trade Commission, said the Clean Air Act Amendments of 1990, the Clean Water Act and the Resource Conservation and Recovery Act have led to expenditures of $635M in 1992 for carbon steelmakers and $57M for stainless and alloy tool steel producers. Between 1988 and 1990, capital expenditures on air quality increased by >300%, rising another 95% in 1991 to $323.2M.

L. Viani. Cited: *Am. Met. Mark.*, Vol 101 (No. 236), 8 Dec 1993, p 16 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199401-S4-0002.

Better Science in Risk Management Rule Urged by Industry Group. At a public hearing in Houston, Texas, USA, the Synthetic Organic Chemical Manufacturers Association (SOCMA) told EPA that its requirements for worst case scenarios in planning for accidental chemical releases need to incorporate better science. The vice president of environmental affairs for Dixie Chemical Co., Houston, told EPA that its definition of worst case scenario was flawed. That definition requires that facilities assume a complete, instantaneous release of a substance and that all active and passive mitigations fail. Johnson said that this is a physical impossibility for most facilities and a plan based on this definition would unnecessarily alarm communities. SOCMA, which represents many custom chemical producers, recommends a tiered approach to risk planning that would give companies the ability to tailor plans to specific sites and products.

Cited: *Chem. Eng. News*, Vol 72 (No. 5), 31 Jan 1994, p 15 [in English]. ISSN: 0009-2347. PHOTOCOPY ORDER NUMBER: 199401-P7-0020.

EPA Lists Toxic Chemicals to Help Protect Public From Accidental Releases. The US Environmental Protection Agency (EPA) has published a new citizen's right-to-know list of toxic substances that is intended to enable communities to protect themselves from catastrophic accidental releases. This list of chemicals was mandated by the 1990 Clean Air Act Amendments. In addition to 25 substances specifically included by Congress, it contains substances EPA believes are the most likely to be accidentally released and cause injury. On a practical front, EPA's accident-prevention efforts overlap considerably with very similar requirements issued by the Occupational Safety and Health Administration (OSHA). The chemical industry is already moving to comply with OSHA's process safety standard, which also requires planning within the plant to prevent accidents. The Clean Air Act charges both OSHA and EPA with trying to prevent or minimize the consequences of a catastrophic accident. OSHA is expected to focus on effects inside the plant; EPA, on the impacts outside the plant fence.

D. Hanson. Cited: *Chem. Eng. News*, Vol 72 (No. 5), 31 Jan 1994, p 16-17 [in English]. ISSN: 0009-2347. PHOTOCOPY ORDER NUMBER: 199401-P4-0004.

South Coast [US] Air Quality Update. In the US, the South Coast Air Quality Management District (SCAQMD) presented its proposed amendments to Rule 1162 for polyester resin operations at a December

workshop. The objectives of the proposed amendments are to remove the current exemptions for use of specialty resins such as gel coats, fire retardant polyester resins, corrosion resistant polyester resins, and high-performance boat resins. The proposed amendments will include new monomer content limits for these materials. They would permit monomer contents of up to 50% for the various categories of the specialty resins used in the SCAQMD. The new limits reflect the technology currently achieved by the polyester resin industry, which has been defined by numerous SCAQMD/Industry Task Force meetings over the past year. When completed, the draft environmental document will be submitted for a 45-day public review period. The amendments will become effective 1 July 1994.
Cited: *CI on Composites*, Dec 1993-Jan 1994, p 12 [in English]. PHOTOCOPY ORDER NUMBER: 199401-P4-0003.

New Clean Water Bill May Affect [US] Processors. A US Senate subcommittee is to begin work 2 February on a Clean Water Act renewal bill that could call upon processors and resin suppliers to reduce the amount of toxic pollutants they emit. A subcommittee of the Senate Environment and Public Works Committee will hear a version of the Water Pollution Prevention and Control Act that subcommittee Chairman Bob Graham, D-Florida, sponsored 24 January. The bill's provisions on toxic pollutants would require some factories to develop pollution prevention plans for the first time. The bill would cover plants that report emissions or off-site transfers of >200,000 lb/year of toxic chemicals. About 37,000 plants would be affected.
J. Gardner. Cited: *Plastics News (Detroit)*, Vol 5 (No. 48), 31 Jan 1994, p 8 [in English]. ISSN: 1042-802X. PHOTOCOPY ORDER NUMBER: 199401-P4-0002.

EPA Wants Fewer Emissions of PVC Precursor. The US Environmental Protection Agency is urging further reductions in emissions of the PVC precursor ethylene dichloride at resin plants because of its possible cancer-causing effects. However, it also says that vinyl makers, which consume nearly all of the EDC in the US, are responsible for only a small part of total emissions. EPA ranks EDC 53rd in emissions to the environment reported under the agency's inventory of toxic chemical releases in 1989. It was tenth among suspected carcinogens. Federal regulations considered EDC a hazardous pollutant if emitted into the air or water or disposed of on land.
J. Gardner. Cited: *Plastics News (Detroit)*, Vol 5 (No. 46), 17 Jan 1994, p 9 [in English]. ISSN: 1042-802X. PHOTOCOPY ORDER NUMBER: 199401-P4-0001.

Guidance of OSHA PELS. In the US, Society of the Plastics Industry's attorneys recently prepared an analysis and summary of the current regulation of occupational exposure to styrene. SPI members may obtain copies of the complete analysis by contacting the SPI Composites Institute office. Among excerpts from this document: the Eleventh Circuit's invalidation of the 1989 air Contaminants Standard means that the federally enforceable PEL for styrene has now reverted to the 1971 level—a PEL (permissible exposure level) of 100 ppm TWA (time weighted average for 8 h), an acceptable ceiling concentration of 200 ppm, and a maximum peak above ceiling of 600 ppm for exposures of ≤5 min during any 3 h period. Employers should, however, be cautious about abandoning the more restrictive 1989 levels (50 ppm for 8 h TWA and 100 ppm for 15 min short term exposure) for a number of reasons which are given.
Cited: *CI on Composites*, Dec 1993-Jan 1994, p 5 [in English]. PHOTOCOPY ORDER NUMBER: 199401-D4-0004.

Enhanced Monitoring Required of Major Sources. Under a proposed Enhanced Monitoring Program published in October, the US EPA will require all major sources of hazardous air pollutants to employ enhanced monitoring techniques to ensure and demonstrate continuous compliance with applicable emissions limits. Composites facilities emitting more than ten tons/year of styrene are major sources. Enhanced monitoring may be based on such equipment or techniques as continuous emissions monitors, continuous process or control device parameter monitoring systems or procedures, emission calculations based on accepted engineering estimation techniques, periodic verification of emissions, or process parameters or control device parameters using portable or in situ measurement devices. The exact enhanced monitoring protocol to be required for composites manufacturers will be the subject of negotiations with EPA during Maximum Achievable Control Technology development.
Cited: *CI on Composites*, Dec 1993-Jan 1994, p 4 [in English]. PHOTOCOPY ORDER NUMBER: 199401-D4-0003.

[US] EPA May Ask Processors to Disclose Emissions. In the US, processors for the first time would be required to report emissions of some fiber reinforcements and hydrochlorofluorocarbons under a proposed expansion of the federal government's inventory of toxic chemical releases. EPA argues that glass and refractory ceramic fibers, sometimes used as reinforcements in plastics composites, may cause cancer, and as a result, their emissions should be reported. Meanwhile, EPA says HCFCs, which sometimes are used as foaming agents, damage the earth's ozone layer, which protects the earth from skin-damaging ultraviolet radiation. Eight other chemicals and substances used by the plastics industry also would be added to the list of chemicals for which the Environmental Protection Agency requires emissions data. The list would nearly double in number to 633 if the proposal is approved. The proposal would take effect 1 January 1995.
J. Gardner. Cited: *Plastics News (Detroit)*, Vol 5 (No. 46), 17 Jan 1994, p 6 [in English]. ISSN: 1042-802X. PHOTOCOPY ORDER NUMBER: 199401-D4-0001.

Homestake's Portion of Cleanup in Dispute. Homestake Mining Co. will have to foot at least part of an estimated $25M bill for the cleanup of its uranium mill tailings site in New Mexico, USA. Until 1990, Homestake's mill processed U to produce yellowcake, a form of uranium oxide used in the production of fuel rods for nuclear reactors. Mill tailings from the processing of U ores amount to approximately 22 million tons covering 245 acres just north of Milan in northwestern New Mexico. Working in conjunction with the Nuclear Regulatory Commission, the US Environmental Protection Agency will oversee and evaluate work done by Homestake before project approval is weighed. NRC was designated the lead agency in assuring that the site is decontaminated and decommissioned to regulatory standards. Homestake's work will include the placement of a compacted clay cover, topped by three feet of soil, to meet NRC stability standards of 200 to 1000 years.
E. Worden. Cited: *Am. Met. Mark.*, Vol 102 (No. 16), 25 Jan 1994, p 6 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199401-G4-0005.

New EPA Proposal Aimed at Chromium. A new proposal from the Environmental Protection Agency would cut chromium emissions sharply at as many as 5000 anodizing and electroplating operations nationwide. The proposed air-emission regulation calls for the use of maximum achievable pollution control technology. The proposal is expected to affect 5000 electroplating and anodizing operations and to reduce US Cr emissions by 99% from current levels. Less than 10% of Cr production goes into electroplating and anodizing, according to a Cr specialist at the US Bureau of Mines. But there are numerous companies—big and small—that perform electroplating and anodizing functions, including metal producers and processors.
B. Schmitt. Cited: *Am. Met. Mark.*, Vol 101 (No. 248), 28 Dec 1993, p 7 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199401-G4-0004.

Safety and Health Penalties Hit North Chicago Brass Plant. The US Occupational Safety and Health Administration (OSHA) has issued citations alleging numerous safety and health violations at a North Chicago, Illinois, USA, brass refinery where two employees died 12 June, after inhaling lethal fumes. An OSHA investigation revealed 40 violations at North Chicago Refiners and Smelters division of R. Lavin & Sons, where two employees were overcome by carbon monoxide during a cleaning procedure. Eight other employees were overcome and treated at local hospitals. OSHA has assessed $229,000 in fines against North Chicago Refiners for the alleged violations.
M.E. Goodwin. Cited: *Am. Met. Mark.*, Vol 101 (No. 250), 30 Dec 1993, p 12 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199401-G4-0002.

European Aluminum Industry Tries to Minimize Effect of EC Legislation. The European aluminum industry is lobbying on several fronts to minimize moves underway by the European Commission to introduce regulations on energy, packaging and waste, and on automotive wrecks which would have far-reaching effects on its operations within the European Union. In the case of energy, the EC's momentum towards introducing an Energy/CO_2 tax aimed at reducing carbon dioxide emissions into the atmosphere is reaching a critical stage. For the $2.5 billion European Al industry, whose costs are among the highest in the world and who are increasingly having to choose between: running loss making smelters; or

close down capacity, a tax imposed on energy could be expected to raise costs significantly. For most European smelters, the break-even price for Al is >$200/mt higher than current market prices.

Cited: *Platt's Metals Week*, Vol 2 (No. 12), Dec 1993, p 8. ISSN: 0026-0975. PHOTOCOPY ORDER NUMBER: 199401-G4-0001.

Current Environmental Issues Facing the Lead, Zinc and Cadmium Industries. Challenges to the continued production and use of lead and cadmium have increased during the past several years. These challenges have been on charges that the production and use of these metals result in illness in both occupationally exposed workers and the general population. Prominence has been given to some studies suggesting subtle, but perhaps adverse health effects on workers and the general population. Both Pb and Cd are toxic and both have produced well-documented cases of illness. Lead attacks primarily the nervous system, the hematopoeitic or blood forming system, and the kidney. There have been suggestions that low level Pb exposure can result in lowered intelligence in children and may impair a variety of biochemical processes in the body. Based on animal evidence, Pb is regarded as a possible human carcinogen. Cadmium attacks primarily the kidney and, according to some studies, may produce lung cancer. As a result of concerns about toxicity, there have been numerous governmental and intergovernmental initiatives proposing or enacting stringent standards for emissions in the air and water. Concerns have also been expressed about the levels of Pb and Cd in soil and dust from prior uses and industrial activity. Additional concerns have been expressed regarding disposal of Pb and Cd containing products in landfills and municipal waste incinerators. Programs encouraging substitution of Pb and Cd in products with other materials have been suggested and outright bans on certain uses have been either suggested or, in limited cases, enacted. While Zn is not regarded as being a toxicant in the same category as Pb and Cd, there have, nonetheless, been concerns expressed about Zn as a toxicant to fish and other aquatic organisms. Zinc runoff from galvanized structures, which also can contain Pb and Cd, is a subject of ongoing study.

J.F. Cole. Cited: *1st Int. Conf. Processing Materials for Properties*, 7-10 Nov 1993 (Honolulu, HI), International Lead Zinc Research Organization, The Minerals, Metals & Materials Society (TMS), 1993, p 145-148 [in English]. PHOTOCOPY ORDER NUMBER: 199401-71-0055.

Recycling Technology in the Japanese Electroplating Industry. Recycling and recovery of plating chemicals and water are indispensable technologies in the Japanese electroplating industry due to pollution problems and conservation of resources. The Environmental Administration of Japan has become increasingly more stringent since 1970. The first oil crisis in 1973 drew attention to the increased need of recycling resources. This paper describes basic concepts of recycling and recovery technologies which utilize a portable type of ion exchanger used in plating processes. It also reports centralized ion exchange regeneration system (so-called resource center) which has been successfully operating since 1976, and has been contributing for recycling of resources in large recycling loops in the Japanese electroplating industry.

A. Yagishita, T. Fukuta, and K. Yagishita. Cited: *1st Int. Conf. Processing Materials for Properties*, 7-10 Nov 1993 (Honolulu, HI), Sanshin Manufacturing, The Minerals, Metals & Materials Society (TMS), 1993, p 113-116 [in English]. PHOTOCOPY ORDER NUMBER: 199401-58-0016.

Control of Waste Products From the Aluminum Melting Process Over the Next Ten Years. This paper reviews and indicates some of the steps necessary to control aluminum melting wastes up to and beyond the year 2000. It considers the regulations and regulatory steps, either in place, or contemplated in various parts of the world. Various methods of Al dross handling and processing are discussed, with reference to processes and equipment currently in operation. Further steps necessary to maximize the metal recovery, while at the same time, minimize the use of salt fluxes or the difficulty of disposal of residues are discussed. The type of equipment and the actions required to control gaseous emissions, particularly when melting certain types of contaminated Al scrap, are discussed and analyzed with some suggestions and recommendations. A review is made of the control of fine particulate matter and baghouse dusts and recommendations and suggestions made on the limitation or elimination of these emissions. The conditions pertaining to final waste disposal and landfill are reviewed in some detail. A system is proposed that allows for in-plant recovery or "cradle to grave" management of melting process, waste products and emissions.

J.P. McMahon. Cited: *Aluminium 2000: 2nd Int. Congr. Aluminium 1993*, 29 March-4 April 1993 (Florence, Italy), Vol 1, Interall Publications, Modena, Italy, 1993, p 283-292 [in English]. PHOTOCOPY ORDER NUMBER: 199401-51-0059.

Furthermore...

Journal of Materials Research (JMR) will feature a ***special section of original research papers on environmentally benign materials processes*** in its March 1994 issue. The manuscript deadline is 15 July 1994. The official journal of the interdisciplinary Materials Research Society, JMR has accepted papers on related topics, but not until now has JMR focused on environmental issues. Authors should send manuscripts (one original plus three copies) for consideration to Dr. Robert A. Laudise, Editor-in-Chief, Journal of Materials Research, Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237, tel: 412/367-9111; fax: 412/367-4373. They should indicate that the manuscripts are intended for the JMR March 1994 special section on environmentally benign materials and processes.

On 31 March 1994, the **California Supreme Court** upheld the Fourth District Court of Appeals' September 1992 ruling, in the case of Palm Springs Recycling Center vs. the City of Rancho Mirage and Waste Management of the Desert, Inc., that the city's and its franchised waste hauler's attempt to control the flow of recyclable materials is illegal. This ruling is a ***landmark in establishing that recyclables that have not been discarded by their owner are not waste subject to exclusive franchise agreements*** and reaffirmed the owner's right to sell recyclables. It is a setback to governmental attempts to introduce "flow control," a practice by which governments attempt to claim title to all solid waste materials generated within a specific area or jurisdiction including, under the heading of "solid waste," scrap metals, paper, plastics, glass, rubber, and textiles derived from industrial, commercial, and household sources. Although the state law permits a governing body to determine how solid waste may be handled within its borders, the Supreme Court ruled that "property does not become waste under the [California Integrated Waste Management] Act until discarded." The Court also said that the "fundamental purpose of the Act is to reduce the amount of material entering into the waste stream," and "the buying and selling of materials in the marketplace is inapposite to that purpose because those materials remain in circulation and do not enter into the waste stream."

In anticipation of new laws that restrict the use of solvent cleaners, many manufacturers using hazardous solvents for cleaning procedures are searching for ***safer and more cost-efficient methods.***

L&R Manufacturing Company

L&R Manufacturing Company, Kearney, N.J., has an international reputation for its expertise in ultrasonic cleaning systems and solutions. One solution used by L&R is SF1, a solvent-free solution that is designed to be strong enough to remove light oils, greases, and ordinary shop soils—but still safe for aluminum and many plastics. SF1 contains no glycol ethers or other hazardous petroleum-based solvents. L&R's Evaluation Department is accepting representative samples of materials companies need cleaned. Chemists will analyze the soil, and under laboratory tests, will provide a model cleaning procedure — including the optimal solution to use, the proper dilution, temperature of the ultrasonic tank, and cleaning time. For more information, contact L&R Manufacturing Company, 577 Elm Street, Kearny, NJ 07032-3604; tel: 201/991-5330; fax: 201/991-5870.

In 1994, **Degussa AG,** Frankfurt, Germany, is projecting a substantial increase in the volume of used automotive catalytic converters. Whereas in 1991 only some 200,000 catalysts were recycled in Europe, this figure is expected to grow to around one million in 1995 and to at least eight million by the year 2000. One of the world's leading producers of new auto-exhaust catalysts, Degussa has an annual production capacity of 20 million units and operates the largest precious metal refinery on the European continent. At the company's precious metals refinery in Hanau-Wolfgang, with the installation of an electrical high-temperature furnace in 1992, Degussa created the technical prerequisites for the ***nearly complete recovery of the precious metals contained in used catalysts***. Operations are undertaken by utilizing as little energy use as possible and with minimal environmental impact. Degussa has joined four large regional companies to found the Degussa Catalyst Network, and is pursuing the goal of obtaining additional partners from other European countries. Catalyst recycling does not require waste dump space. After reprocessing as reusable substances, the precious metals and the steel casing can easily be reused in the production of new catalysts or for other technical applications. Even the ceramic slag remaining after the reprocessing is fully utilized by the construction sector and metallurgical industry, according to the company. For more information, contact Degussa AG, Corporate Communications, D-60287 Frankfurt am Main, Germany; tel: 69/218-2860; fax: 69/218-3743.

Degussa AG
