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The citations and abstracts in *The Engineering Index Monthly* are arranged under main subject headings selected from Engineering Information, Inc.'s authority list of indexing terms, *SHE: Subject Headings for Engineering*, which is published separately. Where indicated in *SHE*, Ei's main subject headings may be further combined with subheadings in order to provide a more specific description of the subject (e.g., SEMICONDUCTOR DIODES, IMPATT—Microwaves). In *The Engineering Index Monthly*, main subject headings are printed in boldface upper case, while subheadings are printed in boldface upper and lower case.

The Engineering Index Monthly abstract number is found at the beginning of each abstract. Abstract numbers run consecutively from month to month, starting with number 000001 in January of each year. It should be noted that the abstract numbers in *The Engineering Index Monthly* are not the same as those found in *The Engineering Index Annual*, as these two sets of numbers result from separate sorting processes.

The title of the article (or conference proceeding, report, monograph, etc.) follows the abstract number and is printed in boldface. If a title is in a language other than English, an English translation of the title will follow, enclosed in brackets and printed in boldface.

Following the text of the abstract, the bibliographic citation is presented. The citation includes the author(s) or editor(s) name(s), the first author's or editor's affiliation and information describing the source document in which the paper appears. The source information is in abbreviated form. The full title of the original source material may be found in Ei's *PIE: Publications Indexed for Engineering*, a separate publication.

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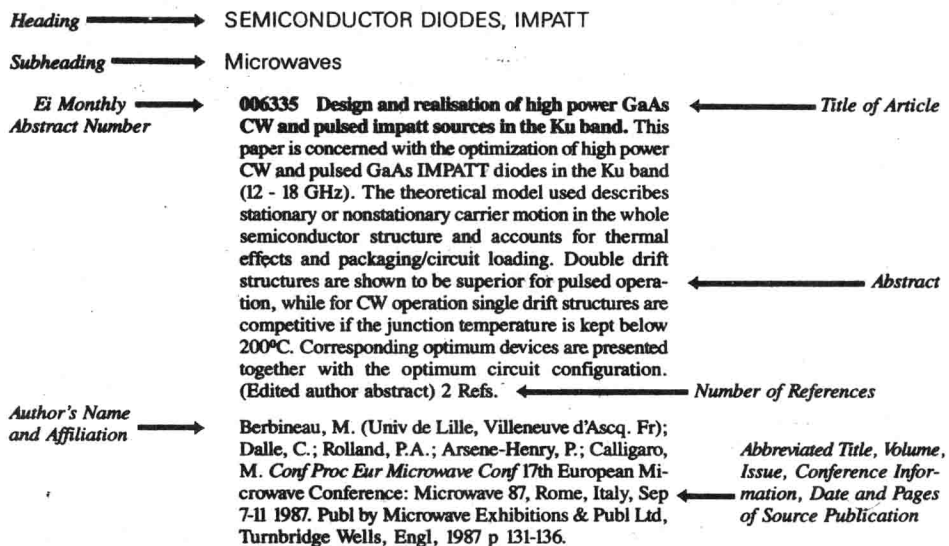
BY SUBJECT—IN THE ABSTRACT SECTION

Abstracts are arranged under the heading or heading-subheading combination which best represents the main subject area of the original article. The controlled vocabulary from which headings and subheadings are selected is found in the Ei publication, *SHE: Subject Headings for Engineering*.

To locate abstract(s) of interest, search under appropriate subject terms, under specific applications of the subject, and under synonymous terminology. For example, if you are interested in the general subject of composite materials, search in the abstract section of *The Engineering Index® Monthly* under SEMICONDUCTOR DIODES, IMPATT, which is a valid heading. If you are interested in a specific aspect or application of semiconductor diodes, IMPATT, such as "thermal conductivity" or "microwaves", search under the main heading SEMICONDUCTOR DIODES, IMPATT and the subheading of choice. You will find applicable subheadings arranged in alphabetical order following the main heading.

SAMPLE ENTRY

The following example identifies the elements of a typical record.



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The Subject Index is an alphabetical arrangement of both controlled vocabulary, printed in boldface, and free language terminology, printed in lightface, which provides access to the abstracts in each issue of *The Engineering Index® Monthly*.

To identify abstracts of interest, search under headings and heading-subheading combinations from Ei's *SHE: Subject Headings for Engineering*; search also under acronyms, popular terminology, software program names, trademarks and product names, other proper names, specific chemicals, metals, materials, etc. The heading "Ei Review" refers the user to records which describe an entire conference proceedings or monograph.

Subject entries are followed by *The Engineering Index Monthly* abstract number(s) which provide direct access to relevant abstracts.

Example—

<i>Controlled Vocabulary Heading</i>	→	SEMICONDUCTOR DIODES, IM- PATT	
		Microwaves	006335
		Semiconducting Silicon	006336
<i>Controlled Vocabulary Subheading</i>	→	Thermal Conductivity	006337
		SEMIMAGNETIC SEMICONDUCTORS	006367
<i>Free Language Term</i>	→	SEMIMETALLIC BISMUTH	000663

BY AUTHOR

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Example—

Berak, E.G., 004619, 006445
Berben, P.H., 007031
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Commencing with the 1973 edition, abstracts printed in *The Engineering Index Annual* are numbered consecutively within each year for ease of reference from *The Engineering Index Annual* Author Index, Author Affiliation Index, and Subject Index. This consecutive numbering differs from the numbering of *The Engineering Index Monthly*.

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AECL	Atomic Energy of Canada Limited	CERN	Organisation Europeenne pour la Recherche Nucleaire
AEG	Allgemeine Elektrizitaets Gesellschaft		
AEI	Associated Electrical Industries		
AERE	Atomic Energy Research Establishment (of UKAEA)	CIB	Conseil International du Batiment pour la Recherche, l'Etude et la Documentation
AFB	Air Force Base	CIBA	Chemical Industry in Basel
AFIPS	American Federation of Information Processing Societies	CIGRE	Conference Internationale de Grands Reseaux Electriques a Haute Tension
AFS	American Foundrymen's Society	CIM	Canadian Institute of Mining and Metallurgy
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ISA	Instrument Society of America	SME	Society of Manufacturing Engineers
ISI	Iron and Steel Institute (UK)	SMPTE	Society of Motion Picture and Television Engineers
ISO	International Standards Organization	SNAME	Society of Naval Architects and Marine Engineers
ITT	International Telephone and Telegraph	SNCF	Societe Nationale des Chemins de Fer Francais
IUPAC	International Union of Pure and Applied Chemistry	SPI	Society of the Plastics Industry
IVF	Institutet fuer Verkstadsteknisk Forskning (Swed)	SPIE	The International Society for Optical Engineering
JAERI	Japan Atomic Energy Research Institute	SRI Int	Stanford Research Institute International
JPL	Jet Propulsion Laboratory	TAPPI	Technical Association of the Pulp and Paper Industry
JSAE	Japan Society of Automotive Engineers	3M	Minnesota Mining and Manufacturing Company
JSME	Japan Society of Mechanical Engineers	TISCO	Tata Iron and Steel Company
KDD	Kokusai Denshin Denwa	TNO	Toegepast Natuurwetenschappelijk Onderzoek
KFA	Kernforschungsanlage Juelich GmbH	TRI	Transportation Research Institute
MIT	Massachusetts Institute of Technology	TRW	Thompson, Ramo, Wooldridge, Incorporated
NACE	National Association of Corrosion Engineers	TVA	Tennessee Valley Authority (US)
NAPE	National Association of Power Engineers	UKAEA	United Kingdom Atomic Energy Authority
NAS	National Academy of Sciences (US)	UN	United Nations
NAS-NRC	National Academy of Sciences — National Research Council (US)	UNESCO	United Nations Educational, Scientific and Cultural Organization
NASA	National Aeronautics and Space Administration (US)	USDA	United States Department of Agriculture
NATO	North Atlantic Treaty Organization	VDE	Verband Deutscher Electrotechniker
NBS	National Bureau of Standards (US)	VDI	Verein Deutscher Ingenieure
NCB	National Coal Board (UK)	VGB	Vereinigung der Grosskraftwerksbetreiber
NEC	Nippon Electric Company	WHO	World Health Organization
NEMA	National Electrical Manufacturers Association	WMO	World Meteorological Organization
NFAIS	National Federation of Abstracting and Indexing Services	WRC	Welding Research Council
NGPA	Natural Gas Processors Association	ZIS	Zentralinstitut fuer Schweissttechnik
NHK	Nippon Hoso Kyokai		
NIH	National Institutes of Health		
NOAA	National Oceanic and Atmospheric Administration (US)		
NPL	National Physical Laboratory (UK)		

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A

ABRASIVES

Plastics Applications

000001 *Vacu-blast custom-designed blastroom reduces processing times.* Ramsgate-based Aviation Engineering & Maintenance Ltd (AEM) reports a reduction in component processing times following its switch to Vacu-Blast dry blasting using plastic/prunus media for paint stripping. This, together with a number of other streamline measures, has resulted in the company being able to maintain one of the fastest sub-contract aerospace equipment maintenance services in the UK. AEM previously used an all chemical method to remove paint from components - mainly aircraft undercarriage assemblies and hydraulic equipment. After trials, AEM became one of the first companies in the UK to adopt the relatively new process of dry blasting plastic media. Media consumption is reported to be low, which minimizes costs.

Anon. *Anti Corros Methods Mater* v 35 n 5 May 1988 p 9.

000002 *Scangrit, the expendable abrasive manufacturer, have recently completed the refurbishment of its Dundee production plant.* Opened in 1981, the plant supplies Scangrit expendable abrasives to the whole of Scotland with particular emphasis upon the Aberdeen area's requirements of offshore work. Work carried out at the plant includes the installation of a new drying unit, new dust extraction systems and the provision of increased storage area for the finished product. The raw material processed by the plant is copper slag which is brought in from Boliden Metall's copper smelter at Ronnskar in Northern Sweden. This slag is subjected to a fuming process to remove the zinc and lead which are not removed in the smelting process. The resulting slag is ideally suited as an expendable abrasive.

Anon. *Anti Corros Methods Mater* v 35 n 5 May 1988 p 7-8.

000003 *High quality abrasive improves roll surface texturing technology.* Barton Abrasives Ltd, a UK manufacturer of metallic abrasives, has combined technical skills with the British Steel Corporation's Shotton Works, Clwyd, North Wales, which has assisted the launch of a new high quality hematite chilled iron abrasive - 'Starbrasive'. Starbrasive is claimed to be more economical than either conventional chilled iron grit or hard steel grit. This, coupled with its superior etching qualities make it ideal for surface texturing of cold mill rolls and for any application where a consistent etched surface is required. Applications include any items which are to be metal sprayed, painted, enamelled or surface coated. A surface finish is obtained by abrasive blasting of the work rolls with the resultant texture produced on the rolls being rolled into the strip surface.

Anon. *Anti Corros Methods Mater* v 35 n 5 May 1988 p 10.

ABS RESINS

Fiber Reinforcement

000004 *Measurements of the 'Magnex DC' characteristics at microwave frequencies.* This paper deals with the measurements of the equivalent impedance, insertion loss (IL), and return loss (RL) of a conductive composite material called Magnex DC performed at microwave

frequencies. It is found that the equivalent impedance decreases as the frequency increases in the X-band (8-12.4 GHz) and the IL of a 1.4mm thick specimen is greater than 9db over the whole band. The utilization of this material in electromagnetic shielding is considered. Results of the measurements performed on a tapered specimen are also reported. (Author abstract) 11 Refs.

Baker, Z.O. (Univ of Jordan, Amman, Jordan); Abdelazeez, M.K.; Zihlif, A.M. *J Mater Sci* v 23 n 8 Aug 1988 p 2995-3000.

ACCELERATORS

Control Systems

000005 *Personal computers in accelerator control.* The advent of the personal computer has created a popular movement which has also made a strong impact on science and engineering. Flexible software environments combined with good computational performance and large storage capacities are becoming available at steadily decreasing costs. Of equal importance is the quality of the user interface offered on many of these products. Graphics and screen interaction is available in ways that were only possible on specialized systems before. Accelerator engineers were quick to pick up the new technology. The first applications were probably for controllers and data gatherers for beam measurement equipment. Others followed, and today it is conceivable to make a personal computer a standard component of an accelerator control system. This paper reviews the experience gained at CERN so far and describes the approach taken in the design of the common control center for the SPS and the future LEP accelerators. The design goal has been to be able to integrate personal computers into the accelerator control system and to build the operator's workplace around it. (Author abstract) 32 Refs.

Anderssen, P.S. (CERN, Geneva, Switz). *Comput Phys Commun* v 50 n 1&2 Jul 1988 Microcomputers and Graphics in Physics - Proceedings of the 7th European Summer School on Computing Techniques in Physics, Southern Bohemia, Czech, Jun 9-18 1987. p 89-99.

Microwaves

000006 *Applications of microwave to antiproton control.* A major achievement in particle accelerator physics has been the invention of stochastic cooling, a method which increases the density of beams of rare particles, like antiprotons, by several orders of magnitude. The beam circulates in a storage ring where it is sampled by electromagnetic devices which detect and correct the statistical fluctuations in position and energy. The efficiency is related to the sampling resolution which is itself associated with the system frequency bandwidth, a few gigahertz in practice. The coupling structures are made of electrode arrays connected by combiner or splitter networks. The dynamic range may exceed 150 dB yet fulfils stringent linear characteristics. At the detection stage, the thermal noise is reduced using cryo-electronic techniques. At the other end of the amplification chain, solid state amplifiers delivering up to 100 W CW power have been preferred to travelling wave tubes for reasons of phase linearity, lifetime and economy. The performances and technological aspects of the microwave systems are discussed by the example of the CERN antiproton project, ACOL. (Author abstract) 12 Refs.

Autin, B. (CERN, Geneva, Switz); Carron, G.; Caspers, F.; Thorndahl, L. *Conf Proc Eur Microwave Conf* 17th European Microwave Conference: Microwave 87, Rome,

Italy, Sep 7-11 1987. Publ by Microwave Exhibitions & Publ Ltd, Turnbridge Wells, Engl, 1987 p 33-49.

ACCELERATORS, LINEAR

Control Systems

000007 *Graphics software of the Saclay Linear Accelerator control system.* The graphics software used for the control of the Saclay Linear Accelerator is described. The specific requirements that such a software must have in this environment are outlined and some typical applications are presented. (Author abstract) 3 Refs.

Gournay, J.F. (CEN, Yvette, Fr). *Comput Phys Commun* v 50 n 1&2 Jul 1988 Microcomputers and Graphics in Physics - Proceedings of the 7th European Summer School on Computing Techniques in Physics, Southern Bohemia, Czech, Jun 9-18 1987. p 247-254.

ACCELERATORS, SYNCHROTRON

Beam Dynamics

000008 *Depolarizing resonance correction in polarized proton beam acceleration up to 5.0 GeV at the KEK PS.* The research and development of polarized proton acceleration is being carried out at the KEK 12 GeV proton synchrotron. This paper describes the phenomena encountered in accelerating a polarized proton beam up to 5.0 GeV. Besides conventional methods for correcting depolarizing resonance, an adiabatic resonance crossing with pulsed quadrupole magnets has been successfully applied to correct strong intrinsic resonances. At present, 90 percent of the linac polarization has been preserved in the booster synchrotron with reduced accelerating of rf voltage to avoid the depolarization by synchrotron oscillation. In the main ring, 90 percent and 50 percent of the booster beam polarization was preserved at 3.5 GeV and 5.0 GeV, respectively. The KEK PS is the first cascaded synchrotron which has demonstrated a polarized proton beam. (Author abstract) 28 Refs.

Sato, Hikaru (Natl Lab for High Energy Physics, Tsukuba, Jpn). *Jpn J Appl Phys Part 1* v 27 pt 1 n 6 Jun 1988 p 1022-1030.

ACCELEROMETERS

Calibration

000009 *Integrating accelerometer and velocity meter records.* An accelerometer is an attractive instrument for measuring shock and vibration motions because it is small and rugged with little interaction effect on the base structure to which it is attached. It can also be located in many otherwise inconvenient areas. However, there are some potentially serious problems when accelerometer signals are directly integrated to produce velocities and displacements. Throughout this paper, a perfect accelerometer is assumed, i.e., the acceleration along its active axis is truly recorded while this recorded signal is unaffected by acceleration orthogonal to the active axis. Three potential problems are examined: the integration and double integration of a simple sinusoidal wave; the effect of shaking, i.e., rotations about some point or points during a shock motion; and, for some circuits, the effect of small imperfections in the calibration. 1 Ref.

O'Hara, G.J. (Univ of Maryland, College Park, MD, USA); Cunniff, P.F. *Exp Tech* v 12 n 10 Oct 1988 p 22-25.

ACCIDENT PREVENTION

000010 Fundamental structure of safety of the safety confirmation type (about the condition of safety confirmation structure). From the standpoint of human safety, safety must be entrusted to 'safety of the safety confirmation type', which is based on three principles: 'Principle of safety confirmation of safe work', 'Principle of unconditional safety', and 'Principle of safety confirmation structure'. In this report, the requisite for 'Principle of safety confirmation structure' is discussed. The machinery system needs interlocking structure, i.e. the operation of a system is permitted only when a safety confirmation signal is received. In the step of generating safety information, the detector must detect not hazard but safety. In the step of transmitting the safety information, the relation between input and output must be 'unate'. To satisfy this, 'safety' must be denoted by 'active state', and therefore there may be no negation operation. (Author abstract) 7 Refs. In Japanese.

Sugimoto, Noboru; Kumekawa, Soichi; Fukaya, Ki-yoshi; Shimizu, Shoken; Umezaki, Sigeo; Ikeda, Hiroyasu; Houshi, Toshiro; Futsuhara, Koichi. *Nippon Kikai Gakkai Ronbunshu C Hen* v 54 n 505 Sep 1988 p 2284-2292.

ACCIDENTS

Human Factors

000011 Commentary: models of the decision maker in unforeseen accidents. Two basic issues have been raised by the papers and the discussion of this session: they refer to the context in which decisions have to be taken and to the actor who has the duty to decide. In our case, the context is represented by the accidents occurring in risky technological environments such as process industries and nuclear power plants; the actor is the operator. This simple categorization is, by the way, the most reasonable one when approaching the problem from a systemic point of view: the world that is the object of our analysis is the man and the machine; accidents represent the story and the negative feedback through which models and theories of the world are constructed. 20 Refs.

Mancini, G. (Joint Research Cent Ispra Establishment, Varese, Italy). *Int J Man Mach Stud* v 27 n 5-6 Nov-Dec 1987, Cognitive Engineering in Dynamic Worlds, Papers, Ispra, Italy, Nov 11-14 1986. p 631-639.

ACETONE

Condensation

000012 Condensation of acetone using metal hydroxide and hydrous metal oxide catalysts. It appears that metal hydroxide base strength is a dominant factor in determining the rate of condensation of acetone. It is proposed that the relative rate of reaction is determined by the strength of the complex between the diacetone product and the metal ion. The selectivity for diacetone alcohol does not vary monotonically with the ionic size and is, presumably, determined by factors other than base strength. (Author abstract) 14 Refs.

Dabbagh, Hossein (Kentucky Energy Cabinet Lab, Lexington, KY, USA); Davis, Burtron H. *J Mol Catal* v 48 n 1 Oct 17 1988 p 117-122.

ACETYLENE

Chlorination

000013 Vapour phase hydrochlorination of acetylene with group VIII and IB metal chloride catalysts. A comparative study of the activity of carbon supported metal chlorides for the hydrochlorination of acetylene is described. The results confirm that the standard electrode potential of the metal is a useful correlation parameter and confirm a previous prediction that catalysts based on gold are particularly active. Initial studies on catalyst reactivation and the mechanism of catalyst deactivation are discussed, and in particular a facile hydrogen chloride treatment for reactivation of carbon sup-

ported H₂AuCl₄ catalyst is described. (Author abstract) 13 Refs.

Nkosi, B. (Univ of the Witwatersrand, Johannesburg, S Afr); Coville, N.J.; Hutchings, G.J. *Appl Catal* v 43 n-1 Oct 17 1988 p 33-39.

Combustion

000014 Concentration measurements of atomic hydrogen in subatmospheric premixed C₂H₄O₂/Ar flat flames. Absolute number densities of atomic hydrogen have been measured in subatmospheric, premixed C₂H₄O₂/Ar flat flames via two-photon excited fluorescence. The fuel-equivalence ratios of the flames were 1.0 and 1.7. The fluorescence measurements are calibrated by partial equilibrium calculations and corrected for quenching effects by assuming a constant average cross-section and using kinetic theory. A sensitivity analysis of the calibration procedure reveals that slightly rich flames appear to be the best candidates for calibrating fluorescence measurements of atomic hydrogen by partial equilibrium. (Author abstract)

Salmon, J. Thaddeus (Purdue Univ, West Lafayette, IN, USA); Laurendeau, Normand M. *Combust Flame* v 74 n 3 Dec 1988 p 221-231.

ACIDS

Inorganic

000015 Ion exchange of HTaWO₆·nH₂O (n=0.5-1.5) with a layered structure. Ion exchange of HTaWO₆·nH₂O having a layered structure was attempted with the alkaline ions (Na⁺, K⁺, Rb⁺ and Cs⁺). The x-ray powder patterns of the ion-exchanged compounds were indexed with tetragonal cells similar to that of HTaWO₆·nH₂O, the c-axis are almost doubled when compared with that of LiTaWO₆, the starting material for the preparation of HTaWO₆·nH₂O. The degree of ion exchange and the length of the c-axis were dependent on the ionic radii of alkaline ions. The layered structure remained unchanged after complete dehydration to A_xTaWO_{5.5+x/2}, and finally a tetragonal bronze type phase for A=Na or a hexagonal bronze type phase for A=K, Rb and Cs appeared at elevated temperatures. These differences from alkaline ions are discussed in terms of ionic radii. (Edited author abstract) 18 Refs.

Kumada, Nobuhiro (Yamanashi Univ, Kofu, Jpn); Takeshita, Masahide; Muto, Fumio; Kinomura, Nobukazu. *Mater Res Bull* v 23 n 7 Jul 1988 p 1053-1060.

Oxidation

000016 Kinetics of formic acid oxidation in advanced porous electrodes. The electrochemical oxidation of formic acid HCOOH at porous PTFE-bonded platinum-carbon electrodes in acidic electrolyte has been studied using the ac-impedance method. A reaction sequence based on known details of this process was transferred into an equivalent circuit which was used to simulate successfully the measured impedance data. The results confirm earlier data obtained with smooth platinum electrodes and allow, for the first time, a correlation between the electrode overpotential and the contribution of the various reaction steps. Further improvements of the porous electrode based on these results are suggested. (Author abstract) 27 Refs.

Holze, Rudolf (Univ Bonn, Bonn, West Ger); Luna, Ana-Maria Castro. *J Appl Electrochem* v 18 n 5 Sep 1988 p 679-686.

Precipitation

000017 Coprecipitation of organic acids with calcium sulfite solids. Coprecipitation of dicarboxylic acids with calcium sulfite was studied at conditions typical of limestone slurry scrubbing for flue gas desulfurization. The effects of solution composition were modeled by equilibrium using the calculated activity of the ion pair of the calcium salt of the organic acid. The ratio of the organic acid concentration in (CaSO₃)_{0.2}(CaSO₄)_{0.2}·1/2H₂O solids

to ion pair activity at 55°C was 6.9, 13.2, and 194 for adipic, glutaric, and succinic acids, respectively. These relationships are reflected in reduced coprecipitation at lower dissolved calcium and pH. (Author abstract) 10 Refs.

Ruiz-Alsop, Rosa (Univ of Texas at Austin, Austin, TX, USA); Rochelle, Gary. *Ind Eng Chem Res* v 27 n 11 Nov 1988 p 2123-2126.

Thin Films

000018 Charge incorporation in ω - tricosenoic acid Langmuir-Blodgett multilayers. In order to investigate the amount of charge introduced into Langmuir-Blodgett (LB) films, multilayers of ω-tricosenoic acid have been deposited onto a number of silicon substrates under different dipping conditions. The effects of moisture and storage conditions on film properties have been examined, and a new mathematical model for the charge distribution within an LB film multilayer will be proposed. (Author abstract) 5 Refs.

Evans, N.J. (Univ of Durham, Durham, Engl); Petty, M.C.; Roberts, G.G. *Thin Solid Films* v 160 Jun 1988 Third international conference on Langmuir-Blodgett films: Part 2 - Papers, Goettingen, West Ger, Jul 26-31 1987. p 177-185.

Wear Resisting

000019 Anti-wear properties of hydroxycarboxylic acids with straight alkyl chains. Some hydroxycarboxylic acids may produce tribochemically polymerized surface protective molecular layers on rubbing surfaces. The mechanisms of anti-wear action of the hydroxycarboxylic acids are discussed in this paper. In addition, the effect of the other polar molecules which coexist with the hydroxycarboxylic acids, and the anti-wear functions of hydroxycarboxylic acids as anti-wear additives for synthetic base oils having high polarity are discussed. (Author abstract) 5 Refs.

Masuko, M. (Tokyo Inst of Technology, Tokyo, Jpn); Ohmori, T.; Okabe, H. *Tribol Int* v 21 n 4 Aug 1988 p 199-203.

ACOUSTIC IMAGING

Sensors

000020 Application de la methode des elements finis a l'etude de cavites piezoelectriques: influence de la geometrie sur les modes de vibration et leur coefficient de couplage. [Application of the finite element method to the study of piezoelectric cavities. Influence of the geometry on the vibration modes and their coupling coefficient]. The evolution of probes used for acoustical imaging has led to a new technology using elementary parallelepipedic piezoelectric cavities. The aim of this study is modeling the behavior of such cavities; the author uses the finite element method: from local equations, he establishes a variational formulation for the problem, the discretization leads to the definition of elementary matrices that are assembled to obtain a system of linear equations. The mass and stiffness matrices are found in the same way as for elasticity problems; the electric variables introduce a 'dielectric stiffness' matrix and a 'piezoelectric stiffness' matrix. The search for eigenvalues and eigenvectors gives the resonant modes of the elementary cavity, then computes the coupling coefficient for each mode. This study was made for blocks of different sizes in order to determine the influence of their geometry on their vibrations. Concurrently, an experimental study was made of these blocks, showing good agreement with the calculated values. (Edited author abstract) 12 Refs. In French.

Challande, P. (Lab de Mecanique Physique, St.-Cyr-l'Ecole, Fr). *J Mec Theor Appl* v 7 n 4 1988 p 461-477.