

ing AlN by anodic dissolution of the metal in amines, by *U. Schubert* (FRG) "Sol-Gel Processing of Transition Metal Complexes" describing materials in which a transition metal complex moiety is bound by an inert spacer and an anchoring group to a silica gel matrix, and by *H. Schmidt* (FRG), who gave in his paper "Inorganic-Organic Polymers by Sol-Gel Techniques" first impressions about the manifold possibilities of organic modified silicates.

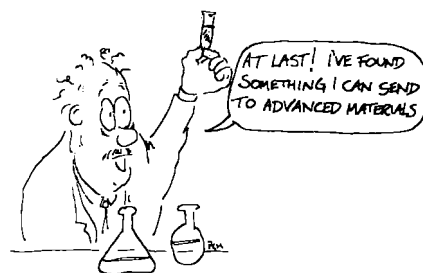
Many of the papers dealt with the possible applications of sol-gel derived materials. *J. Fricke* (FRG) "SiO₂-Aerogels—Structure, Properties, Applications" demonstrated that aerogels, due to their porosity, have very unusual but useful properties. Another example was presented in the paper "Oxide Gels, New Materials for Micro-Ionics" from *J. Livage* (France) who gave examples of systems which are

good candidates for making "all-gel" derived micro-ionic devices.

On the whole, one can say that the goal of the meeting, of discussing the fundamental and applicationally oriented aspects of sol-gel processing with respect to material preparation, technology and structure/property relationships, was fulfilled, much to the credit of *H. Schmidt* from the Fraunhofer-Institut für Silicatforschung (Würzburg, FRG), who had composed this most interesting scientific program. This positive impression was not altered by the recognition that the great hopes for sol-gel technology have been somewhat overdone: today it is possible to make coatings by this method in considerable variety but until we succeed in making bulk materials on an industrial scale there will be much to do.

Materials Forum

Companies and individuals wishing their news and views on advanced materials issues and products to be considered for coverage in this section should send press releases, correspondence and other details, in English, to: Materials Forum, ADVANCED MATERIALS, P.O. Box 101161, D-6940 Weinheim, Federal Republic of Germany.



Durable Thermometer for Molten Metals

Conventional thermometers used to measure the temperature of, for example, molten steel are usually destroyed very quickly by the environment and provide data for only 1–3 seconds.

A new thermometer, developed by Nippon Steel and the Asahi Glass Co.

has a functioning lifetime of over 40 hours. This increased durability is achieved by encasing the thermometer in a tube made from the advanced ceramic zirconium boride which has a melting point of 3060 °C allowing continuous measurement of temperatures up to 1600 °C.

Continuous monitoring of the temperature enables the effects of defect inclusions to be located precisely, processing abnormalities to be prevented and energy to be saved.

Further information is available from the Nippon Steel Corporation, Königsallee 30, Düsseldorf 4, FRG.

Laser Microscope for Surfaces

Zygo has introduced the Maxim 3D three-dimensional noncontact laser microscope for the measurement of surface structure. Its optical design allows it to measure coated carbon surfaces as easily as polished aluminum substrates.

Combining the capabilities of an optical microscope with the measurement resolution of phase-measuring interferometry, the Maxim 3D can perform vertical, lateral, angular and positional measurements to 6 Å vertical resolution and less than 0.5-micrometer lateral resolution. Three-dimensional measurements allow accurate analysis of surface

defects, which can be located at low magnification, then measured at higher magnification by rotating the turret. Details from Zygo Corporation, Laurel Brook Road, Middlefield, Connecticut 06450, USA.

Field Emission Scanning Electron Microscope

International Scientific Instruments of California, USA have introduced a new field emission scanning electron microscope called the DS-130F which offers high resolution and large-sample handling capability. It is a dual stage microscope which provides nanometer resolution in its top stage and maintains 2 nm resolution in the bottom stage even with a large sample (up to 6 inches diameter).

The DS-130F operates in the 10^{−8} torr range and even at an electron beam energy of 1 kV provides resolution in the top and bottom stages of 4 and 10 nm respectively. Further features are a new condenser lens system, a high brightness thermal field emission gun and the high stability of the emission current, which makes tip flashing unnecessary.

More details are available from International Scientific Instruments, 1457 McCarthy Boulevard, Milpitas, California 95035, USA.

New Generation of Turbomolecular Vacuum Pumps

TURBOVAC 150, 360 and 1000 V and H (see figure) from Leybold AG are universal turbomolecular pumps with continuous oil lubrication. The modular design of the pumps makes them suitable for various kind of applications including normal high vacuum research or demanding industrial tasks such as plasma etching. The pumps are highly reliable due to a well proven oil lubrication system. The bearings are continuously lubricated with filtered oil and any particles which beat the filter are flushed out by the oil.



The V-versions (vertical) are designed for upright installation only, while the H-version (horizontal) can be incorporated between the vertical and horizontal. With a modification kit the V-version can be converted at a later time for horizontal use.

Special Features: Inert gas seal system for the protection of the lubricant and bearings; Integral vent port to ensure "clean venting" of the pump; Simple oil level control and oil changing; Water or optional air-cooling; Inlet flanges in ISO-K, CF and ASA in different sizes available.

For more information contact Otmar Reuter, Leybold AG, Bonner Strasse 498, D-5000 Cologne 51, FRG. Tel. (0221)347-1556.

Intelligent Liquids

Liquids, whose viscosity can be dramatically altered in a fraction of a second by the application of an electric field have been developed by Bayer. Silicone oils mixed with aluminum silicate form the basis of the new materials whose aggregation state is regulated by the applied voltage which ranges up to 2000 V (with very low current).

Although Bayer have not yet developed market-ready applications for these "intelligent liquids", uses can be envisaged, for example, in shock absorbers in cars which can react immediately to every road contour. Other properties include thermal stability, an ignition point of over 250 °C and compatibility with elastomeric materials. Further details available from Bayer AG, Bayerwerk, D-5090 Leverkusen, FRG. Tel. (0214) 30-72215.

Superconductivity

The nature of the Fermi-liquid electronic states in the high- T_c superconductor $\text{Bi}_2\text{CaSr}_2\text{Cu}_2\text{O}_8$ has, until recently, been a matter of controversy. Some workers have attributed the existence of these states to the 2p orbitals of the BiO plane and others to those of the CuO_2 plane.

If the Fermi-liquid states were supplied by the BiO plane, which is not present in other copper-oxide superconductors, then the mechanisms for superconductivity based on the Fermi-liquid states would lose their experimental basis.

Using scanning tunneling spectroscopy (STS), an extension of scanning tunneling microscopy (STM), combined with photoemission (PES) and inverse photoemission (IPES) spectroscopies, Tanaka et al., *Nature* 339 (1989) 691, have shown, reassuringly, that the Fermi-liquid states reside not in the BiO planes but in the CuO_2 planes and this description of the states should provide an experimental basis on which models of high- T_c conductivity in the copper oxide materials can be built.

New Polyamide Curing Agent

Industrial Copolymers Limited (ICL), manufacturers of speciality resins, based in Preston, UK, has added a further product to its innovative range. The company announces the introduction of INCOREZ 147LV, a new polyamide curing agent for water dispersed epoxies which it claims, according to the Gardner scale, is the lowest color polyamide curing agent presently on the market.

INCOREZ 147LV is a major step forward in technology allowing formulators to achieve white coatings comparable in color with solvent based counterparts. INCOREZ 147LV also has a faster cure rate and is capable of being infinitely diluted with water, retains a high solids content of 75% and can be formulated into matt, semi-gloss and full gloss coatings.

A variety of coating markets is envisaged including solvent sensitive areas, abrasion resistant applications and primers for concrete. Additionally, the product can be used in cementitious screeds to improve chemical resistance and adhesion to damp substrates.

For more information contact P. Mileham, ICL, P.O. Box 7, London Road, Preston PR1 4AJ, Lancashire, UK. Tel. (0772) 59781.

K' 89

The 11th International Plastics and Rubber Trade Fair (Kunststoffe '89, K '89) runs from November 2.-9. 1989 in Düsseldorf, FRG. With over 220,000 visitors and 1700 exhibitors in 1986 the "K" is one of the biggest materials trade fairs and this year is expected to be even bigger. Approximately 50% of both the visitors and the exhibitors are from West Germany, the other half coming from more than 40 countries making it a truly international exhibition.

The fair is aimed at the innovative users of plastics and rubbers in for example automotive construction, electrical engineering, electronics and aerospace, exhibitors representing everything from raw materials producers to applications engineers.