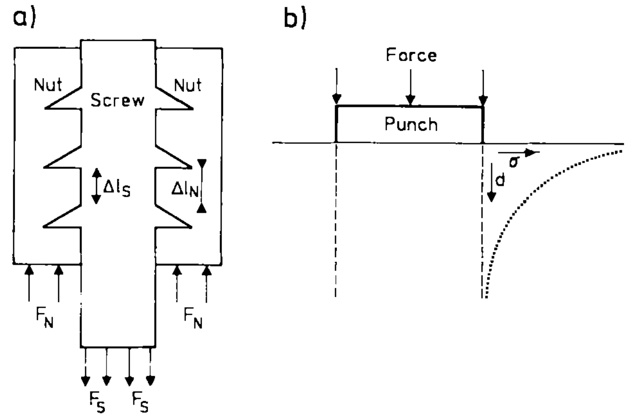

Fig. 3. a) The "nut and bolt" of identical materials results in a severe stress concentration on the first thread. Δl_s = elongation, Δl_N = compression. If the cross sections are equal $|\Delta l_s| = |-\Delta l_N|$, $\sum F_s = \sum F_N$. The cylinder underneath the circular punch (b) represents the situation of complete isoelasticity and of an ideal bonding to its environment within this half space. The dotted curve shows the stresses along the dashed interface between this cylinder and the environment and the extreme stress concentration towards the surface. It is this stress concentration that allows for all punching processes! σ stresses along d, d distance along dotted line.

stiff as the surrounding bone. As such an implant can be realized only with fiber reinforced plastics, this idea has found much attention in chemically oriented research groups. This concept, however, violates very basic and old rules of mechanical engineering. This has already been shown previously for two special cases[15,16] and is explained on general terms in Figure 3.

6. Final Remark

The application of bone forming stimulants along implant to bone interfaces might be beneficial during part of the healing phase. As the stability of implant fixation essentially depends on the load pattern in the adjacent bony tissue and on the biochemical influences of the implant materials, hardly any contribution of such extracts can be expected for long term implant reliability.

The recent observation[17] of a particularly favorable adhesion of fibroblasts onto controlled surface undulations with dimensions in the one to two microns range can be regarded as a means to understand the bond formation on the Ti-powder coated surfaces. It appears that further results from this ongoing study will provide deeper insights into such surface mediated responses of cells and, thus, allow for further improvements of implant anchorage.

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Conference Reports

Graphite Intercalation Compounds in Berlin

By Ralph Setton *

The fifth international symposium on graphite intercalation compounds sponsored by the Freie Universität Berlin, was held in Berlin (West), on May 22.–25., 1989. It was attended by 137 scientists from 17 countries, with West Germany, France, Japan and the United States contributing about 85% of the participants. Fourteen invited talks were presented, as well as 41 other papers and 73 posters. Following a well-established custom of these symposia, seventeen

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presentations were not directly related to graphite but involved other low-dimensional solids such as chalcogenides, conducting polymers, or layered hydroxides.

It has often been said that whoever wants to learn all about solid-state chemistry or physics need only study the graphite intercalation compounds (GICs), as shown by the following summary of the presentations.

The synthesis of graphite-like materials of composition BC_3, C_5N and BC_2N was described by *N. Bartlett*, Berkeley. In another plenary lecture, *J. Rouxel*, Nantes, discussed the design and synthesis of a large variety of low-dimensional compounds, whereas *T. J. Pinnavaia*, East Lansing, presented various synthetic layered pillared structures.

The thermodynamic requisites of intercalation were exposed by *A. Hérold*, Nancy, and *W. Metz*, Hamburg, discussed nucleation processes and threshold pressures. *P. Lagrange*, Nancy, described the intercalation of Cs–Sb and Cs–As alloys while co-intercalation from the vapor phase of potassium and rare earth elements was presented by *H. Suematsu*, Tokyo. A 1st-stage CoC_{14} was obtained electrochemically by *P. Touzain*, Grenoble, by reduction of a $CoCl_2$ GIC, whereas high pressure was used by *I. T. Belash*, Moscow, to synthesize 'super-rich' GICs of Li, Na, or K, all of them metastable at normal temperature and pressure.

Intercalate exchange was shown by *E. Stumpp*, Clausthal, and by *H. P. Boehm*, Munich, to be capable of yielding hitherto unknown metal halide GICs and *M. Inagaki*, Toyohashi, detailed the preparation of metal halide GICs from molten salts. New GICs of Nb or Ta fluorides, in which the valence state of the metal is not V but III or IV, were announced by *A. Hamwi*, Clermont, while *T. Nakajima*, Kyoto, described a series of GICs of various stages containing fluorides of Ti, V, Nb or Ta with excess fluorine, or the volatile oxyfluorides WO_2F_2 or WOF_4. GICs of molybdenum oxynitrate and of Ce, Hg, Pt or Au nitrates were described by *E. Stumpp*.

D. Guérard, Nancy, has completed the series of ternary GICs with alkali metals and hydrogen, some of them showing unexpected stability towards air and water. Similarly, the ternary alkaline earth-NH_3 GICs prepared by *E. Stumpp* complete the series started in 1955 by the late *W. Rüdorff*. In the ternary GICs prepared by *J. O. Besenhard*, Münster, *D. Billaud*, Nancy, or *K. Lüders*, Berlin, water or nitromethane is the third component solvating the intercalated anion. The ternary GIC studied by *F. Béguin*, Orléans, contains an organic molecule physisorbed at room temperature.

Somewhat similar to the ternary GICs, the bi-intercalation compound presented by *H. Suematsu* contains sequential layers of potassium and $MoCl_5$. Other structural determinations addressed phase transitions induced by pressure (*K. Syassen*, Stuttgart, *S. Matsuzaki*, Kumamoto, *O. E. Andersson*, Umeå, *I. T. Belash*) or by temperature (*F. Rousseaux*, Orléans, *P. Lagrange*, *P. Behrens*, Konstanz). Charge transfer between host lattice and guest was discussed by *S. Flandrois*, Bordeaux, *W. Metz*, *S. Ikehata*, Tokyo, *A. Métrot*, Reims, *R. Setton*, Orléans, and *H. Zabel*, Urbana. Closely related to these problems are the EXAFS and XANES measurements carried out by *W. Metz*, *A. Tressaud*, Bordeaux, and *G. Wortmann*, Berlin, while band structure calculations and experimental verifications of some of their features were given by *S. Rabii*, Philadelphia, *W. Berthold*, Dortmund, *K. Nakao*, Tsukuba, and *A. Charlier*, Metz. Problems of lattice dynamics were studied by *S. A. Solin* and by *S. D. Mahanti*, both from East Lansing, *H. C. Gupta*, New Delhi, *W. Lassmann*, Hannover, *J. E. Fischer*, Philadelphia, and new experimental methods for their study were presented by *Y. Yacoby*, Jerusalem.

Some physical methods of investigation, such as resistivity measurements or X-ray diffraction, are now so commonplace in solid-state studies that there is no point in detailing the cases in which they are used. It is interesting however to note that *W. Metz* showed that a new correction factor must be used to obtain good agreement between calculated and experimentally determined intensities of the X-ray spectra. Magnetic properties, both static and dynamic, also seem to be used so extensively (over 20 papers!) that individual presentation of the papers is impossible, in spite of the numerous interesting results thus obtained. More spectacular are the 'pictures' obtained by Scanning Tunneling Microscopy of the atoms on the external surfaces of GICs presented by *R. Wiesendanger*, Basel.

It is worth noting that increasing attention is paid to applications of GICs: as electrochemical sensors for charge in Pb batteries (*H. Krohn*, Duisburg), as catalysts for the synthesis of NH_3 (*K. Kalucki*, Szczecin), in rechargeable Li batteries (*M. Endo*, Nagano), in the separation of the isotopes of hydrogen (*T. Terai*, Tokyo), etc.

The Fifth International Symposium on Graphite Intercalation Compounds was a highly successful meeting in which the latest expertise in the field was made available and for which the organizers, Professors *K. Lüders* and *R. Schöllhorn*, are to be highly congratulated.

Books received:

The Vibrational Spectroscopy of Polymers. By D. I. Bower and W. F. Maddams. Cambridge University Press, Cambridge 1989. xiii, 326 pp., bound, US $ 89.50. – ISBN 0-521-24633-4. **Handbook of Ion Beam Processing Technology.** Ed. by J. J. Cuomo et al. Noyes Publications, Park Ridge 1989. xviii, 438 pp., bound, US $ 72. – ISBN 0-8155-1199-X. **Corrosion Handbook, Vol. 4.** Ed. by D. Behrens. VCH Verlagsgesellschaft, Weinheim 1989. x, 392 pp., bound, DM 775. – ISBN 3-527-26655-0. **Materials Testing for the Metal Forming Industry.** By K. Pöhlandt. Springer-Verlag, Berlin 1989. xi, 240 pp., bound, DM 108. – ISBN 3-540-16722-6. **Quantitative Image Analysis of Microstructures.** Edited by H. E. Exner and H. P. Hougardy. DGM Informationsgesellschaft Verlag, Oberursel 1988. 235 pp., bound, DM 95. – ISBN 3-88355-132-5. **Transmission Electron Microscopy.** By L. Reimer. Springer-Verlag, Berlin 1989. xiii, 547 pp., soft cover, DM 128. – ISBN 3-540-50499-0.