

MIDWEST SOLID STATE CONFERENCE

A Report by Fred T. Phelps

"AROUND the Fermi surface in twenty-four hours" is an appropriate description of the 1960 Midwest Solid State Physics Conference, which was held on October 21 and 22 at the University of Nebraska, in Lincoln. This, the eighth meeting of the conference, was enjoyed by 75 physicists and engineers from 23 laboratories located in 10 states: California, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, South Dakota, and Nebraska.

Friday, after a laboratory open house and tea at the physics building, Arthur W. Kip of the University of California presented a physics colloquium. That evening the guests were afforded an opportunity for informal discussion at a social gathering. Saturday, sandwiched between nine papers at the morning session and an equal number in the afternoon, was a luncheon at which Professor Kip was the guest speaker.

The subject chosen by Professor Kip for his two papers was the Fermi surface of noble metals. At the colloquium he presented a general review of the recent experimental work which has given a better understanding of the Fermi surface. Since cyclotron resonance falls within the realm of his own research, Professor Kip postponed discussion of this type of experiment until his after-luncheon dissertation entitled, "Cyclotron Resonance in Metals" or, as he referred to it, "With Gun and Camera through the Fermi Sea". He discussed his experiments on copper, which had a relatively well-known Fermi surface; his results for various orbits around the surface are in good agreement with those obtained from other kinds of experiments.

Further work dealing with the Fermi surfaces of metals was described in two fine papers presented by A. V. Gold and A. R. Mackintosh of Iowa State University. The former discussed a de Haas-van Alphen experiment and vividly explained the results using complicated three-dimensional models. The latter presented his work dealing with the magnetoacoustic effect and interpreted the data in terms of complex orbits about the Fermi-surface models displayed earlier by Gold. These four talks combined to make the Fermi surface the dominant topic of this year's conference.

Another field considered was that of color centers in alkali halides. L. I. Grossweiner and A. R. Reinberg of the Illinois Institute of Technology described an interesting experiment dealing with the low-temperature bleaching of F centers in KCl. They found that the effect of bleaching a KCl crystal containing F centers at -196°C is to establish a photostationary equilibrium

number of F' centers. The kinetics of the F to F' conversion was studied by "flash" bleaching F centers by superimposing a short, intense flash of red light on the much weaker, steady F light and thus displacing the F to F' ratio from equilibrium. Alternately, the F' to F conversion can be studied using a green flash. It was found that the kinetic processes establishing equilibrium are characteristic of the crystal and do not depend on the number of F centers present, the direction or extent of displacement from equilibrium, or the method used to produce the coloration.

In another color-center paper, H. W. Breedlove and R. J. Friauf of the University of Kansas discussed polarized absorption experiments using doped KCl. No dichroism was detected for the Z_1 and Z_2 centers which were investigated. Models of these centers consistent with their results were considered.

The 1960 conference, which was sponsored jointly by the Department of Physics and the Research Council of the University of Nebraska, was a success mainly because of the interest and enthusiasm of the attendees. However, credit should be given to those who flurried about at the last minute to get things in order. Among these were J. W. Weymouth, E. A. Pearlstein, B. Anspaugh, J. Epstein, D. Hagerman, J. Rohrs, R. Soepono, C. Skov, G. Sullivan, and T. Wade. At the invitation of O. C. Simpson, next fall's conference will be held at Argonne National Laboratory.

Other Papers Presented at Conference

1. A possible mechanism to explain the discrepancies between measurements of ionic conductivity and diffusion in TiCl_3 (R. J. Friauf, U. of Kansas).
2. A new technique for determining the thermal diffusivity of small samples (L. Kennedy, Iowa State U.).
3. High-temperature thermal conductivity measurements in semiconductors (J. G. Hust and R. G. Morris, South Dakota School of Mines and Technology).
4. Measurement of that part of the Seebeck coefficient caused by phonon drag in Mg_2Si (M. W. Heller, Iowa State U.).
5. An experimental observation of a "deep state" in a silicon tunnel diode (D. A. McWilliams, Iowa State U.).
6. A preliminary report of the production of thin InSb films and the measurement of their properties (E. B. Dale and G. Senecal, Kansas State U.).
7. Photoelectric study of barium oxide (J. E. Dueker, McDonnell Aircraft Corp., and E. B. Hensley, U. of Missouri).
8. Chemical activations of oxide-coated cathodes using carbon as an activator (R. H. Springer, U. of Minnesota).
9. Accumulation of surface charge on dielectrics from corona discharges (N. M. Bashara, U. of Nebraska).
10. The variation of secondary emission from titanium single crystals with the angle of incidence of the primary beam (G. G. Goetz, U. of Minnesota).
11. Paraxial dislocations in cobalt whiskers (R. D. Dragsdorf and R. T. Johnson, Kansas State U.).
12. Growth of dislocation free silicon and germanium crystals and methods of detection of dislocations in these crystals (R. C. Buschert, Purdue U.).
13. Magnetic resistance of iron micro-powders (J. Hanton, U. of Minnesota).
14. Magnetic interactions of cerium and cobalt ions in double nitrate crystals (J. W. Culvahouse, U. of Kansas).

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