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Superconductivity in Platinum Compounds

A review summarising the published data on the superconductivity of platinum group metal compounds was published here in 1984 (1), and since then efforts to understand and develop superconducting materials have continued.

Last year some 390 scientists from twenty countries met in Sendai, Japan, for the Yamada Conference XVIII on Superconductivity in Highly Correlated Fermion Systems, and the proceedings have now been published (2).

Materials containing five of the platinum metals were considered; the exception being osmium, although it is known that high purity osmium and several osmium-containing compounds are superconductors. Of the fifteen contributions that dealt, at least in part, with the platinum metals, six were concerned with the system UPt_3 . Recent developments were reviewed by H. R. Ott, antiferromagnetic ordering has been achieved in UPt_3 by replacing platinum with palladium or gold, or by substituting thorium for uranium. These systems were included in an overview of work on magnetic fluctuation and order, by G. Aeppli. The specific heat and the resistivity of $(U,Th)Pt_3$ were considered by K. Kadowaki. The compound UPt_3 was one of several whose normal ground state properties were investigated by B. Renker, while V. Müller reported the results of ultrasonic attenuation experiments on the same material. Using

polarised light scattering S. L. Cooper examined single crystals of UPt_3 and URu_2Si_2 . Normal and superconducting properties of the latter were reported by Y. Onuki, while a contribution from H. Iwasaki considered superconducting and heavy-fermion behaviour in the $(La_{1-x}Ce_x)Pd_2Ge_2$ system.

The three pseudoternary systems $Ho(Rh_{1-x}Ru_x)_4B_4$, $R(Rh_{1-x}Ru_x)_4B_4$ and $R(Rh_{1-x}Co_x)_4B_4$ were the subjects of contributions by H. Adrian, H. Iwasaki and H. C. Ku, respectively. In addition thermal expansion measurements on the magnetic superconductor $Er_{0.4}Ho_{0.6}Rh_4B_4$ were given by R. Villar, while Y. Koike reported the effects of strain on superconducting and ferromagnetic transitions of $ErRh_4B_4$. The superconducting and magnetic properties of $CeRh_4B_4$ and $PrRh_4B_4$ were reported by K. Kumagai, and evidence for triplet superconductivity in $LuRu_4B_4$ was presented by A. Sulpice.

Regrettably, it is not possible to give here the names of the 63 people who co-authored the papers noted; readers are strongly recommended to refer to the published proceedings.

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