greater bulk resistivity than unworked metal. In runs with gold riders on palladium flats, contact resistance at 100 g rose from about 15 milliohms at the start to about 30 milliohms after 500 revolutions on a one-inch diameter track. This contact resistance is approximately the same as was obtained with an all-palladium system after a similar period of sliding. In stick-slip motion, electrical opens often occur on breakaway when there is momentary separation of rider and flat. Roller debris between the contacts approximately doubles contact resistance; rollers create two constriction resistances in series.

Some Practical Consequences of Prow Formation

All but the hardest noble metals and their alloys have a pronounced tendency to slide by prow formation, because they are not normally covered by oxide or other inorganic films. Consequently, their transfer particles tend to accrete to form prows. Numerous lubricants, effective on base metals, did not prevent prow formation in experiments with a typical noble metal (4).

The contacts in many electrical devices, such as the separable connector used in electronic equipment, do not slide large distances during their lifetimes. Only prow formation is then operative; the transition to rider-wear is not attained. Since prow formation involves preferential wear of one member, the non-wearing member need not be made with as much noble metal as the wearing contact.

The growth of prows requires that the specimens be free to move apart in order to accommodate them. If there is a constraint on the members, as with spring-loaded contacts, the actual load will increase during prow formation, and with this the transfer and wear rates become even greater. If clearances are small, as in sleeve bearing geometry, prows can produce gross seizure of the device.

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The Reactions of Iridium with Boron, Phosphorus and Silicon

Some recent high temperature metallography by Dr Reinacher, of Degussa (*Metall*, 1965, **19**, (7), 707–711), indicates that the alloys of iridium with boron, phosphorus and silicon have eutectics melting at temperatures considerably higher than those of the corresponding platinum and palladium systems. Iridium containing approximately 1.5 per cent by weight of boron begins to melt at 1046°C, the eutectic being formed between IrB and an iridium solid solution of unknown composition. At the iridium rich end of the phosphorus-iridium diagram melting occurs at 1262°C when the compound Ir_2P reacts with what appears to be almost pure iridium. The first compound encountered when silicon is added to iridium is Ir_3Si. With the iridium solid solution this forms a eutectic melting at 1470°C.

Although the silicides, phosphides and borides of iridium have all been previously studied and identified, little attention has hitherto been paid to the melting point relationships in these three binary systems. The present high temperature determinations help to explain what analytical chemists have already known for a long time. Certain difficult fusions which would completely destroy platinum crucibles can be successfully accomplished in iridium, and this paper should do much to encourage the further use of iridium in some types of chemical work.

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