in any great detail with the notable exception of CoPt (17), which has been extensively used in spite of the high cost of the alloy. In fact, cost considerations and perhaps specimen preparation problems have retarded a wider application of this family of alloys, although occasionally they have formed the basis of an experimental study on account of certain unique features, such as the investigation of CuPt, which is the only known ordered alloy with a rhombohedral superlattice.

References

1 R. A. Dugdale and S. D. Ford, *Trans. Br. Ceram. Soc.*, 1966, **65**, 165
2 R. S. Irani, D. Phil. Thesis, Univ. of Sussex, 1971
3 V. S. Arunachalam, Ph.D. Thesis, Univ. Coll. of N. Wales, 1965
4 R. D. Reiswig and J. M. Dickinson, *Trans. A.I.M.E.*, 1964, **230**, 469
5 K. A. Johnson, *I.M.S. Proc.*, 1969, p. 145
6 N. T. Corke, J. Van Landuyt and S. Amelinckx, *Mater. Res. Bull.*, 1969, **4**, 289
7 R. S. Irani and R. W. Cahn, *Metallography*, 1971, **4**, 91
8 J. B. Newkirk, A. H. Geisler, D. L. Martin and R. Smoluchowski, *Trans. A.I.M.E.*, 1950, **188**, 1249
9 H. N. Southworth, *Scripta Metall.*, 1968, **2**, 551
10 A. H. Geisler and J. B. Newkirk, *Trans. A.I.M.E.*, 1954, **200**, 1076
11 H. M. Clark and C. M. Wayman, Phase Transformations, Am. Soc. Metals, 1970, Chapter 2
12 R. S. Irani and R. W. Cahn, *Platinum Metals Rev.*, 1972, **16**, (2), 48–49
13 J. S. Kouvel, Intermetallic Compounds, ed. J. H. Westbrook, Wiley, 1967, Chapter 27
14 W. Jellinghaus, *Z. Tech. Phys.*, 1936, **17**, 33
15 D. J. Craik and F. Nunez, *Proc. Phys. Soc.*, 1961, **78**, 225
16 A. Kussman and G. Von Rittberg, *Ann. Phys.*, 1950, **7**, 173
17 D. J. Craik, *Platinum Metals Rev.*, 1972, **16**, (4), 129–137

The Surface Tension of Molten Glass

A MODIFIED DIPPING CYLINDER METHOD

The detachment method of measuring surface tension was first employed by Wilhelmy in 1863 and was later developed by du Noüy into a commercial instrument. This typically consists of a horizontal iridium-platinum ring attached to one arm of a balance. The ring is then immersed in the liquid. The force required to pull the ring from the surface of the liquid is then measured and is proportional to surface tension.

Du Noüy's method has been applied successfully to the measurement of the surface tension of glass, with the important difference that the ring has evolved into a shallow cylinder. Hitherto some form of balance has been retained with attendant difficulty of usage. This objection has now been overcome by R. L. Tiede of Owens Corning Fiberglas Corp., who measures the pull on the cylinder with a load cell (*Am. Ceram. Soc. Bull.*, 1972, **51**, (6), 539–541). Not only is the new apparatus much quicker and easier to use but it is capable of giving results reproducible to within ± 1 per cent.

The glass, usually about 300 g, is melted in an electrically heated platinum alloy container. The cylinder is attached by a thin wire to the load cell which is slowly raised and lowered by a reversible electric motor. Initially the cylinder is suspended just above the surface of the glass, and a chart recorder, to which the load cell is connected, is adjusted for zero and full scale deflection as appropriate to the type of glass being studied. The cylinder is now lowered until its entire circumference is in contact with the glass; it is then withdrawn from the melt, allowing a characteristic trace to be plotted up to the point of separation from the surface.

The maximum value of the downward force experienced by the cylinder is obtained by calculation from this trace. The surface tension is then obtained by substituting this value into an equation relating surface tension to the dimensions of the cylinder, the downward force and the density of the glass.

The apparatus is sufficiently versatile to permit the rapid determination of surface tension at different temperatures and also to measure viscosity and electrical conductivity before the glass is finally drained from the furnace.

A. D. M. K.