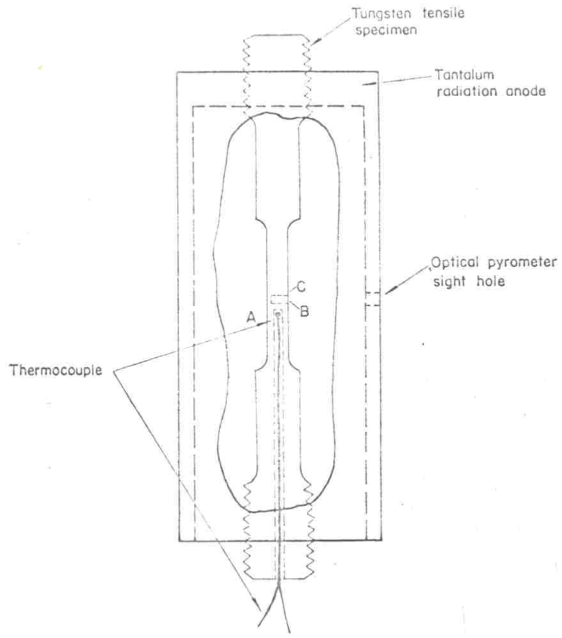

FIG. 2. Schematic drawing of arrangement used for temperature calibration.

During a tensile test the specimen temperature is measured with a calibrated Leeds and Northrup optical pyrometer by sighting on the specimen gauge length through the hole in the tantalum radiation anode. The specimen surface brightness readings were calibrated against true temperature in the following way. A 1.6 mm diam hole was spark machined axially in an electropolished tungsten tensile specimen (12.7 mm gauge length, 3.2 mm gauge diam) to the center of the gauge length and fitted with an insulated Pt/Pt-10 Rh thermocouple which is in contact with the specimen (Fig. 2). Another hole, 0.8 mm diam (length-to-radius ratio = 6) was spark machined in the gauge length perpendicular to the specimen axis for blackbody pyrometer readings.

Table I lists the results from a typical temperature calibration, comparing the thermocouple and blackbody temperatures with optical pyrometer readings on the specimen surface. At temperatures $\gtrsim$1200°C there is excellent agreement between blackbody and thermocouple readings. For temperatures below 1200°C, however, blackbody readings deviated from the thermocouple readings and reliance was placed on the latter. At temperatures >1400°C it was necessary to remove the thermocouple because evaporation from the alumina insulator coated the specimen surface, thereby changing the emissivity, and it was necessary to check the accuracy of the blackbody readings by a melting point determination. A wire of "A" nickel (liquidus temperature = 1446°C) was wound tightly around the specimen directly below the blackbody hole. On heating, the nickel was observed to melt at a temperature of 1446°C as measured by the optical pyrometer blackbody reading. Thus,

TABLE I. Results from typical temperature calibration (refer to Fig. 2).

Pt/Pt-10 Rh thermocouple at A (specimen center)	Optical pyrometer[a] at B (blackbody)	at C (specimen surface)[b]
800°C	904°C	1104°C
972[c]	1021	1240
1090[c]	1113	1328
1191[c]	1194[c]	1395
1315[c]	1317[c]	1486
1398[c]	1400[c]	1554
...	1471[c]	1597
...	1580[c]	1692
...	1729[c]	1815
...	1785[c]	1859
...	1942[c]	2004
...	2085[c]	2139

[a] Optical pyrometer readings are corrected for sight glass losses.
[b] Specimen surface was electropolished as in tensile tests.
[c] "True temperature."

the true temperature (indicated by c in Table I) was taken to be that of the thermocouple readings below 1400°C, and as given by blackbody readings above 1400°C.

This technique has proved successful in elevated temperature tensile testing of tungsten over the temperature range 1000–2000°C.

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[1] R. F. Brodrick, "Development of an Electron Beam Heating Facility and its Use in Mechanical Testing of Tungsten to 6000°F," ASD-TDR-63-484 (July 1963).
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High Pressure Optical Absorption Cell for Reactive Liquids

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When using optical absorption measurements to follow the progress of chemical reactions at pressures up to a few kilobars, or when working with corrosive liquids one requires an absorption cell to separate the liquid which is being examined from the pressure transmitting medium. The cell must be chemically inert and it should be possible to fill it without the inclusion of air and to assemble it quickly into the high pressure bomb.

In the visible part of the spectrum this can be achieved by using a syringe-like glass cell which at its end has two opposing sides flattened to provide optical windows. If these flats are roughly ground and flame polished the scattering by such a cell is usually quite low when it is immersed in the pressure medium. The pressure is trans-

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