vacuum cast palladium without the use of deoxidizer.

Summary

The creep rates of pure platinum, 90 pct Pt, 10 pct Rh and pure palladium at 1382°F (750°C) have been determined using bars 0.290 in. in diam and stresses of 150 to 550 psi in tests lasting up to 3000 hr. The creep rate curves of platinum were normal for stresses of 250 and 400 psi. The creep rate of 90 pct Pt, 10 pct Rh, provided it was given a brief high temperature anneal (1 hr at 1922°F) for grain enlargement, was below that of pure platinum. The creep rate of normally annealed palladium under stresses of 150 and 250 psi was very high for the first 1200 hr but fell to a low value thereafter. Heating the palladium at 1382°F (750°C) for 1200 hr virtually eliminated the first stage of creep and also lowered the rate in the second stage.

Acknowledgment

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Technical Note

Deformation Texture of Body-Centered Cubic Metal Wires

by W. R. Hibbard, Jr., A. E. Roswell, and A. E. Schuetz

THE drawn wire texture of body-centered cubic iron,[1] tungsten,[2] and molybdenum[3] has been determined to be a [110] direction parallel to the wire axis. The purpose of this study is to extend the available information on body-centered cubic wire textures to other metals and alloys.

Wires were produced using hand wire rolls and dies as given in Table I. In addition, attempts were unsuccessful to draw wires from chromium, vanadium (Vanadium Corp. of America), and tungsten (Cleveland Tungsten Inc.). Although it is known that wires can be made from these materials, suitable techniques were not readily adaptable.

Where necessary, wires were polished and etched to form flat ribbons 0.005 to 0.007 in. thick, and transmission X-ray patterns were taken using molybdenum radiation with the specimen tilted 0 degrees from the perpendicular toward the beam to critically cover the wire axis. Analyses were made of (110), (002), and (112) reflection circles.

Table I. Wires Used in Study

Metal	Source	Reduct. in Diam, Pct	Remarks
β brass (51.92 pct)	American Brass Co.	78.1	Hot worked at 600°C
β brass (62.5 pct)	Scovill Mfg. Co.	71.2	Quenched from 875°C, Cold formed
Iron	Armco	97	Cold formed
Molybdenum	North American Phillips	93	Hot formed starting at 550°C, finished at 110°C
Niobium	Rem-Cru	95	Cold formed
Tantalum	Fansteel	97	Cold formed

In all cases reflection maxima indicated the texture to be a single [110] deformation fiber, as illustrated by Fig. 1 for molybdenum. In the case of the hot-worked β brass, a second texture, [100], was also found, but this is believed to be the result of recrystallization since it has been reported for recrystallized molybdenum wires[4] and it was not present in the cold-drawn β brass. The difference in drawability between the 51.92 pct Cu β brass and the 62.5 pct Cu β brass (containing some grain boundary α due to incomplete quenching) is quite striking, since the latter could be cold worked readily while the former had to be hot worked to avoid cracking.

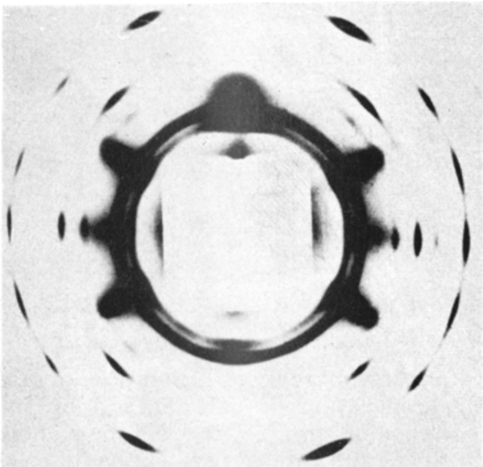

Fig. 1—Molybdenum wire drawn 93 pct reduction in diam.
Wire axis verticle tilted 10° from perpendicular toward the beam. (110) ring shows maxima at 0°, 60°, and 90° from wire axis, (002) ring at 45° and 90°, and (112) ring at 30°, 55°, 73° and 90° indicating a single [110] texture.

Summary

The deformation texture of drawn body-centered cubic wires of β brass, iron, molybdenum, niobium, and tantalum is essentially a single [110] fiber as predicted by theory.[5]

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References

[1] C. S. Barrett and L. H. Levenson: *Trans.* AIME (1939) **135**, p. 327.

[2] M. Ettisch, M. Polyani, and K. Weissenberg: *Ztsch. Physik* (1921) **7**, p. 181.

[3] Z. Jeffries: *Trans.* AIME (1924) **70**, p. 303.

[4] T. Fujiwara: *Proc.* World Eng. Cong., Tokyo, 1929, (1931) **36**, pt. 4, p. 171.

[5] W. R. Hibbard, Jr. and M. K. Yen: *Trans.* AIME (1948) **175**, p. 126; METALS TECHNOLOGY (February 1948).

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