

Errors in chemical analyses of two titanian micas

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J. Jakob (1937) published analyses of three micas which he claimed contained trivalent titanium. His basis for this claim was that these micas contained more reducing power (Fe^{2+}) than total iron and he attributed the excess reducing power to trivalent titanium.

Two of Jakob's micas were procured for this work from the Natural History Museums of Bern, Switzerland and Vienna, Austria. The phlogopite from Burgess, Ontario (Jakob's #1) is the same specimen number (Vienna H.3752) as that used by Jakob. The biotite (Jakob's #3) from Sweden (Bern) is most likely the same specimen number.

Ferrous iron was measured by a variation of Wilson's procedure (Whipple, 1974), and total iron by

silver reductor followed by titration with ceric sulfate. In all cases, great care was taken to redissolve magnesium fluoride produced by attack of hydrofluoric acid on the micas, because much iron can be occluded in the insoluble magnesium fluoride.

The results (Table 1) show that Jakob's analytical chemistry was in error. In neither case does the reducing power (Fe^{2+}) exceed the total iron. A large error occurs in Jakob's #1, from which Jakob recovered only 26 percent of the total iron content.

Jakob's analysis of phlogopite #1 appears in Deer, Howie and Zussman (1962) *Rock-Forming Minerals*, Vol. 3, *Sheet Silicates*, John Wiley and Sons Inc., New York (p. 46, analysis #2) and is incorrect. My chemical analyses show no evidence for trivalent titanium.

Table 1. Ferrous and total iron contents (% by weight)

	Jacob #1		Jacob #3	
	*Fe $^{2+}$	Total Fe	*Fe $^{2+}$	Total Fe
Whipple	0.71±0.01	0.88±0.01	18.56±0.07	20.89±0.02
Jakob	0.65	0.23	23.85	22.24

*Equivalent Fe $^{2+}$ from reducing equivalent.

References

- Jakob, J. (1937) Uber das Auftreten von dreiwertigem Titan in Biotiten. *Schweiz. Mineral. Petrogr. Mitt.*, 17, 149-153.
Whipple, E. R. (1974) A study of Wilson's determination of ferrous iron in silicates. *Chem. Geol.*, 14, 223-238.

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