

Reinterpretation of a Verzasca plagioclase: a correction

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Abstract

A single crystal of a metamorphic plagioclase from Verzasca Valley is An_{38} and not An_{63} , as previously reported (Wenk *et al.* 1980). Structural properties including the satellite vector now conform better with those of igneous plagioclase.

E. Wenk *et al.* (1975) described an intergrowth of andesine (An_{34}) and labradorite (An_{63}) from Gordemo, Verzasca Valley, in which the labradorite had *e* satellites with spacing and orientation typical of plutonic andesine. On the basis of X-ray analyses and electron microscopy of metamorphic plagioclase from the Central Alps, H.-R. Wenk (1979) and H.-R. Wenk and Nakajima (1981) concluded that the satellite *e* vector depends both on chemical composition and thermal history and not only on the An content as reported for igneous plagioclase (Smith, 1974, Figs. 5–12). A crystal from the Verzasca locality (Vz 433) was analyzed in some detail. The *e* vector was determined on a single crystal diffractometer and the average structure was refined from X-ray data (H.-R. Wenk *et al.*, 1980). Microprobe analysis on the same crystal but a different fragment than that used in the refinement gave an An content of 63 percent. H.-R. Wenk *et al.* (1980) found that T–O distances for the Verzasca labradorite deviate from those in Figure 4 obtained for other plagioclases near An_{66} . The T–O distances would fit with a low plagioclase of composition near An_{38} . Also cell angles for the Verzasca labradorite (Wenk *et al.*, Table 1) fit with those for a low plagioclase near An_{38} , and the cell lengths are ambiguous. This was very suspicious and called for a reinvestigation.

New electron microprobe analyses of the same crystal fragment used for the X-ray studies show that it is actually an andesine An_{38} . Presumably the earlier microprobe analysis had been made on the labradorite component of the intergrowth. The new analyses were made with a solid-state detector on an ARL-EMX-SM electron microprobe. The crystal was not removed from the fiber used for X-ray mounting, and a carbon coat was applied. It was necessary to burn a hole through a thin coat of glue. The consistency of Si, Al, Ca and Na values

suggests that the analysis of An_{38} is correct to $\pm An_5$, and analyses down the length of the crystal were mutually consistent. Greater absorption for Na than for Ca X-radiation may have biased the analysis to a higher An content.

The corrected chemical analysis applies to all structural data for 433 Verzasca in the tables published by H.-R. Wenk *et al.* (1980) and to the *e* vector and lattice parameter data in Table 2 of Wenk (1979). It does not apply to the photomicrograph of the *e*-structure (Fig. 2c) in Wenk *et al.* (1980). As part of this investigation we have redetermined the *e* vector of both andesine and labradorite from an intergrowth with selected area electron diffraction and simultaneous microanalysis within the electron microscope. Results are the following.

andesine An_{35-40} : T = 23 Å

labradorite An_{70-75} : T = 35 Å

These values are more similar to those of igneous plagioclase (An_{65-70} : T 42–50 Å, Gay 1956). The same is true for structural parameters which are now similar to those of igneous andesine. Until proven otherwise, there is no need to assume that the *e*-vector of metamorphic plagioclase is a simple function of metamorphic grade as stipulated by H.-R. Wenk (1979). However, recombination of *e* APB's in metamorphic plagioclase demonstrates that the *e* superstructure is less regular than in igneous crystals (Wenk and Nakajima, 1981) which corresponds to observations in annealed metal alloys (Van Tendeloo *et al.* 1975).

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