

Immiscibility in the acid lavas

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Between the glassy periphery of the acid volcanic bodies (domes, flows, dykes) and their crystallized central part there is a zone (several dozens cm to several dozens m), formed of spherulites, dispersed in glassy matrix. The spherulites (several mm to several dozens cm in diameter) are composed of feldspars and quartz (or tridimite) fibbers. They decrease in number to the volcanic body periphery and disappear in its outward part. On the opposite, glassy matrix decreases to the center, forming islands-like shapes among the adjoining spherulites.

There are two genetic hypotheses. According to the first one the spherulites are interrupted crystallization products formed by fast cooling of the melt or by glass devitrification. Second hypothesis argues that they are products of subliquidus immiscibility manifested only during the fast cooling. The latter is not experimentally corroborated but there are many chemical as well as morphological proofs of it (not-wetted surfaces between the spherulites, vesicles' distribution in them, crystallite flows deformation, etc.). In all the cases, notwithstanding the water content in the glass (perlites or obsidians), it is strongly enriched with K and spherulites – with Na. Sometimes there are two-step immiscibility manifested either in the droplets or in the matrix. In the 1st case the large K-rich spherulites contain small albite ones; in the 2nd case the new-formed albite droplets are dispersed in the matrix or they grow on the early-formed spherulites.

Therefore the immiscibility has importance in elucidating morphology of the acid lava bodies but not in the acid magmas differentiation.