Coronas of Corundum Xenocryst in the Tertiary Alkali Basalt

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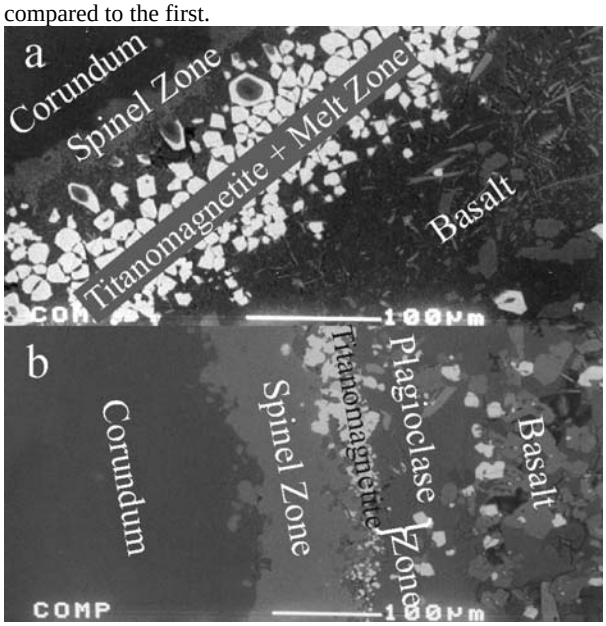
Gem corundums exist not only in placer deposit (secondary deposits), but also in the Tertiary alkali basalt (primary deposits) in Changle area, Shandong province. Coronas are discovered surrounding the primary corundum megacrysts captured by the Tertiary Fangshan alkali basalt through detailed electron microprobe observations. The coronas provide obvious evidences that the corundum megacrysts are xenocrysts.

The coronas could be divided into two types based on their structural characteristics. One type coronas is composed of a narrow spinel zone near the megacryst body and a wide titanomagnetite zone with some melts of alumosilicate as the exterior layer near the host basalt (Figure a), and the other is composed of a wide and stable spinel zone as the interior layer adjacent to the corundum and a plagioclase zone with a few titanomagnetite (Figure b). The spinel belt is less than 40μm width in the former type coronas in which Al_2O_3 content decreases gradually from 85.08~58.94% while MgO and FeO contents vary reversely (5.14~14.83% and 8.08~ 28.24%, respectively), but that of the second type is much wider (about 100μm) and has the more stable composition compared to the first.



The coronas-forming models of the corundums were studied, it is believed that the first type corona is the result of the unequilibrium reaction between the corundums and host alkaline magma, and the second one is resulted from equilibrium or near equilibrium reaction.