

Laserprobe of a zoned hornblende: Step heating and spot dating

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Serpentine melange in Pigna Barney and Glenrock station areas along Peel-Manning Fault system, NSW, Australia includes blue schists, metagabbro and amphibolite. Reported K-Ar age of phengite from blue schist is 470-480 Ma (Fukui et al., 1995), which is considered to represent a subduction system in Paleozoic in eastern Australia.

$^{40}\text{Ar}/^{39}\text{Ar}$ study on a single grain of hornblende from Glenrock was carried out using laser step heating and spot dating on a thin section. The step heating results show variable plateau ages between 200 and 300 Ma. Some grains have step increase in age spectra at the high temperature fractions, and the highest age obtained from the hornblende is nearly 400 Ma, which coincides with reported Rb/Sr ages between 340-425 Ma (Sano et al, 2004). The hornblende typically has a brown core with green rims, and it is sometimes as large as a few millimeters.

Spot dating was carried out on a 8 millimeter sized hornblende with brown core in order to separate the older and younger events and to clarify meaning of variable plateau ages between 200 and 300 Ma. The results were inconclusive due to low potassium concentration of the hornblende and the small sample sizes. On the other hand, muscovite in a thin section with 20 microns sample size from Port Macquarie consistently yielded 440 Ma using pulsed laser beam. Constraints on successful results are considered for these samples.

References

Fukui, S., Watanabe, T., Itaya, T. and Leitch, E.C. (1995) Middle Ordovician high PT metamorphic rocks in eastern Australia: Evidence from K-Ar ages. *Tectonics* **14**, 1014-1020.

Sano, S., Offler, R., Hyodo, H. and Watanabe, T. (2004) Geochemistry and chronology of exotic blocks in serpentinite melange of the southern New England Fold Belt, NSW, Australia. *Gondwana Research*, **7**, 817-831.