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Mode of occurrence of zircon in metagranites from the Pranburi-Hub Kapong area, Thailand

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The metagranites and pelitic-psammitic metamorphic rocks are widely exposed from Pranburi to Hub Kapong, central Thailand. The EPMA dating of monazite (so-called CHIME monazite dating, Suzuki et al., 1994) in a high-grade pelitic metamorphic rock from the south of the study area revealed that the monazite core is 213 Ma and the rim is 83 Ma (Nakano et al., 2010). Yuhara et al. (2011) dated the metagranites by the Rb-Sr whole-rock isochron method. The Hub Kapong gneissic granite that crops out in the north gave 202+/-22 Ma, and the Hua Hin gneissic granite at the central area gave 209+/-14 Ma. The non-foliated granitic rocks in the central area gave 84+/-13Ma. The large error is attributed to the later metamorphism and deformation that postdated granite crystallization. This study aims to constrain the timing of granite crystallization and metamorphism through textural observation and U-Pb dating of zircon by LA-ICPMS.

The foliation of the Hua Hin gneissic granite is defined by the arrangement of Bt +/- Si, and this body is metamorphosed. Zircon in this metagranite has euhedral oscillatory zoning and likely magmatic in origin. Under the cathode luminescence (CL) image, detrital cores and dark overgrowths on them are commonly recognized.

The Hub Kapong gneissic granite is a two-mica granite and muscovite can be metamorphic in origin (Kawakami et al., 2010). This metagranite characteristically contains xenotime-zircon intergrowth of magmatic origin (e.g., Viskupic et al., 2005). Xenotime shows mosaic-like zoning and includes a lot of bright Th-bearing phases under the back scattered electron (BSE) image. It also has many tiny holes and shows spongy texture. Zircon shows idiomorphic oscillatory zoning under BSE image, while it is dark and shows mosaic-like texture under CL image. Rarely, zircon as well includes bright Th-bearing phases under BSE image, and shows spongy texture. This kind of spongy zircon is considered to form by a dissolution-reprecipitation process in a fluid (Geisler et al., 2007). Therefore, zircon in the Hub Kapong gneissic granite would be originally magmatic, but some of them may have experienced the dissolution-reprecipitation process. Yuhara et al. (2011) interpreted that 83 Ma age preserved in the monazite from the pelitic metamorphic rock is likely due to intrusion of the non-foliated granitic rocks. Since the non-foliated granitic rocks are scattered around the Hub Kapong gneissic granite, it is probable that the intrusion of the non-foliated granitic rocks are responsible for the formation of the spongy zircon in the Hub Kapong gneissic granite. These possibilities will be tested through the zircon U-Pb dating by the LA-ICPMS.

Keywords: granite, Thailand, zircon, metamorphism, fluid