

Detrital paragonite from the Piemonte calcschists, western Alps and its influence to K-Ar age of white mica separates

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White micas are common in low to medium grade metamorphic rocks and have been ubiquitous in geochronological study to reveal cooling histories of host rocks. However, some serious discordant K-Ar white mica ages have been reported from the subduction-related metamorphic rocks of SW Japan (Itaya & Takasugi, 1988; Takami et al., 1993; Itaya & Fukui, 1994; Itaya & Fujino, 1999). Scaillet et al. (1992) and Scaillet (1996) also discussed variable white mica Ar-Ar ages due to their chemistry and excess argon in the Dora-Maira massif of western Alps.

Takeshita et al. (1994) carried out K-Ar age determinations of white mica separates from fifty blueschist-facies calcschists collected systematically from the Piemonte zone of the Penninic domain in the western Alps. Takeshita et al. (2004) examined chemistries of white mica from the same samples with EMP. They obtained variable K-Ar white mica ages ranging from 115 Ma to 41 Ma, and anomalously large chemical variations of white mica.

In this study, the chemical observations and XRD analyses of white mica separates show that chemical anomaly of white micas in the chlorite zone are caused by submicroscopic paragonite, and dated fraction with lower K have more paragonite. K contents of dated fraction are also related to K-Ar ages in Takeshita et al (1994). Fractions with lower K content also show relatively older and wider range of ages. Therefore the result presented here strongly suggests that fine-grained paragonites are of detritus probably derived from the pre-Alpine high-temperature metamorphic sequence such the Variscan.

The wide range of the white mica ages from 115 to 41 Ma must be due to mixture of variable amount of detrital paragonite in the separates. This feature is also observed in the chloritoid zone though the age variation is not so large in comparison with that in the chlorite zone. In contrast, white mica separates from the rutile zone with the temperatures higher than 450, have been reset completely during the Alpine HP metamorphism.