

일반세션 논문초록

Cosmic-ray exposure ages of Antarctic CK chondrites, EET 13002, 14007, 15156, 15161 and 15162

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논문초록

Cosmic-ray exposure (CRE) age of meteorite is the time when meteoroid was ejected from its parent body and how long it had orbited around the sun. CRE age distribution is a result of collisional events occurred among asteroids. However, it is not simple to obtain an accurate CRE age, because many factors have to be considered such as abundances of cosmogenic nuclides, flux of cosmic-ray, chemical composition of meteorite, and shielding condition. In the present work, we applied empirical equations to estimate production rates of cosmogenic nuclides [1,2]. However, empirical equations using $^{22}\text{Ne}/^{21}\text{Ne}$ ratio as shielding indicator are not suitable at high shielding condition represented by $^{22}\text{Ne}/^{21}\text{Ne}$ ratio lower than 1.1, because aspect of $^{22}\text{Ne}/^{21}\text{Ne}$ ratio change is different between low shielding and high shielding condition. About a half of CK (Carbonaceous-Karoonda type) chondrites has $^{22}\text{Ne}/^{21}\text{Ne}$ ratios lower than 1.1 [3], thus it is needed to be aware of using the empirical equation to those CK chondrites.

In this study, five Elephant Moraine (EET) CK chondrites (EET 13002, 14007, 15156, 15161 and 15162), newly found by Korean Meteorite Search Team in Antarctica, having $^{22}\text{Ne}/^{21}\text{Ne}$ ratio lower than 1.1, were studied for their CRE ages. Production rates of cosmogenic ^{21}Ne of these meteorites estimated by the empirical equation [1] and by the model calculation [4] were compared. The CRE ages by [1] were 24–25 Ma and 27–28 Ma for EET 14007, 15162 and for EET 13002, 15156, 15161, respectively, while the ages by [4] were 27–49 Ma and 31–55 Ma at the meteoroid radius from 100 to 200 cm and shielding depths matched with each measured $^{22}\text{Ne}/^{21}\text{Ne}$ ratio. EET 13002, 15156, and 15161 belonging to same CRE age group might be paired also supported with other noble gas data, while relationship between EET 14007 and 15162 is not clear. Further study is needed such as mineralogy and other isotope system except cosmogenic noble gases of the studied CK chondrites to constrain their CRE ages and collisional events occurred among asteroids.

References: [1] Eugster (1988) *GCA* 52, 1649–1662. [2] Eugster and Michel (1995) *GCA* 59, 177–199. [3] Schultz and Franke (2004) *MAPS* 39, 1889–1890. [4] Leya and Masarik (2009) *MAPS* 44, 1061–1086.

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