Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)


PPS22-10 会場:415 時間:5 月 1 日 11:45-12:00

# Discovery of stishovite in an Apollo 15 sample and impact record on the Moon

Discovery of stishovite in an Apollo 15 sample and impact record on the Moon

金子 詳平 [1] ; 大谷 栄治 [1*] ; 宮原 正明 [2] ; 小沢 信 [1] ; 荒井 朋子 [3]
KANEKO, Shohei[1] ; OHTANI, Eiji[1*] ; MIYAHARA, Masaaki[2] ; OZAWA, Shin[1] ; ARAI, Tomoko[3]

[1] 東北大学, [2] 広島大学, [3] 千葉工業大学
[1]Tohoku University, [2]Hiroshima University, [3]Chiba Institute of Technology

Thick regolith layers and many craters on the Moon indicate that the Moon has been heavily bombarded after the lunar formation. Short time intervals of high-pressure and high-temperature occurred on the lunar surface during the collision of asteroids on the Moon, and the constituent minerals of the Moon and asteroids transformed into high-pressure polymorphs during the high-pressure and high-temperature conditions. Although many brecciated lunar rocks have been recovered by the Apollo missions, any high-pressure polymorph has not been observed in Apollo samples so far. Silica is one of constituent minerals of terrestrial planets and asteroid. We investigated a lunar regolith collected by the Apollo 15 mission with a special interest on silica, because high-pressure polymorphs of silica are recently reported from shocked lunar meteorites (Ohtani et al., 2011; Miyahara et al., 2013). Here, we show stark evidence for stishovite from a sample collected by the Apollo 15 mission. X-ray diffraction analysis and transmission electron microscopic observations clearly confirmed the existence of a high-pressure polymorph of silica, stishovite, in the Apollo sample, which suggests that the lunar legolith preserves records of early shock events. Considering radio-isotope ages, lithologies, and shock features, stishovite was formed by an impact event in the near side Moon ca. 3.8-4.1 Ga ago.

キーワード: スイテイショバイト, アポロミッション, 衝突, 高温高圧, 月試料
Keywords: Stishvite, Apollo mission, Impact, High pressure and temperature, Lunar sample