

## Carbon in lunar mantle

NAKAMURA, Ryosuke<sup>1\*</sup> ; YAMAMOTO, Satoru<sup>2</sup> ; MATSUNAGA, Tsuneo<sup>2</sup> ; ISHIHARA, Yoshiaki<sup>3</sup>

<sup>1</sup>AIST, <sup>2</sup>NIES, <sup>3</sup>JAXA

If the Moon was created from Earth's mantle by the so-called "Giant Impact", all the volatile component must have been lost from the very hot proto-lunar disk where even silicate is vaporized. Some special form of carbon (graphite, diamond, etc), however, could have survived in the harsh environment. Then, carbon monoxide (CO) could be produced in more reductive lunar mantle (Sato 1979). In fact, many lunar mare basalt samples show vesicular structures, indicating the presence of volatile components in the parent magma.

Another evidence of volatile inside moon is pyroclastic glass in Apollo samples. Volatile-induced pressure is required to produce them even under low gravity and no atmosphere on the Moon. The global survey by spectral profiler (SP) onboard Kaguya has discovered that Sinus Aestuum is the largest pyroclastic deposit on the Moon (Yamamoto et al. 2014). From the spatial extent and thickness, we deduce the total amount of volatile gas which have rapidly brought the parent magma to the surface. Assuming that the gas consists of only CO, we will estimate the carbon content in the lunar mantle.

Keywords: Earth, Moon, mantle, carbon, Remote sensing, Kaguya