LUNAR CRUST COMPONENTS FROM PLANETS AT THE GIANT IMPACT EVENT. Yasunori Miura, Graduate School of Sci. & Eng., Yamaguchi University, Yoshia 1677-1, Yamaguchi, Yamaguchi 753-8512 Japan. yasmiura@yamaguchi-u.ac.jp

Introduction: Origins of lunar crust components with anorthosite composition is not discussed so far, though there are various discussions on separation of light crust and heavy mantle components on the Moon applied by magma ocean process [1].

Impact elements of carbon and chlorine [2] can be used for new impact elements remained after as carbon- and chlorine-bearing materials in the lunar rocks of deeper basalts as "metamorphosed impact remnants" [2, 3, 4, 5, 6], which can be applied for the giant impact event between primordial Earth and Mars-size planet to form the Moon after removing of anorthositic components mainly from primordial Earth.

The present purpose of the paper is that lunar crust components are originally from Earth planet at the giant impact process.

Problem of original sources of the lunar crust: Origin of lunar crust components shown as anorthositic composition is considered to be main problem, except separation of light anorthositic crust and heavy basaltic mantle components on the Moon explained by magma ocean process of isotopic heat sources [1].

The following items listed in Table 1 are main problems for estimation of original components of the lunar crust which is considered to be formation mainly by normal planetary accretion model so far. The present model can be explained energy sources (explained by impacts on airless Moon and heat sources of the giant impact and isotopic mixing from target Earth) [1] as shown in Table 1.

Table 1. Main problems for origin of the lunar crust.

1) Origin of light anothositic components:
(previous model) All rocks planetary bodies with light anorthositic rocks
(present model) Separation from primordial Earth by the giant impact event
2) Origin of separated anorthositic crust:
(previous model) normal planetary accretion and giant impact
(present model) Main source of separated planet mainly from primordial Earth

Impact changes of H, He, C, N and Cl elememts: All light elements should be decreased during impact process [1], though only carbon (C) and chlorine (Cl) elements are fixed to solid states [2, 3, 4, 5, 6] as shown in Fig.1. This is mainly because carbon is fixed to solids of graphite, carbites and carbonates during impact process [2, 3]. On the other hand, hydrogen (H) and helium (He) elements are decreased during impact process [1, 2, 3] (cf. Fig.1). Chlorine (Cl) can be remained as chlorine-bearing materials of akaganeite and halite [2, 3, 4, 5, 6] (cf. Fig.1).

This indicates that C and Cl elements are indicators which can remained even after impact process.

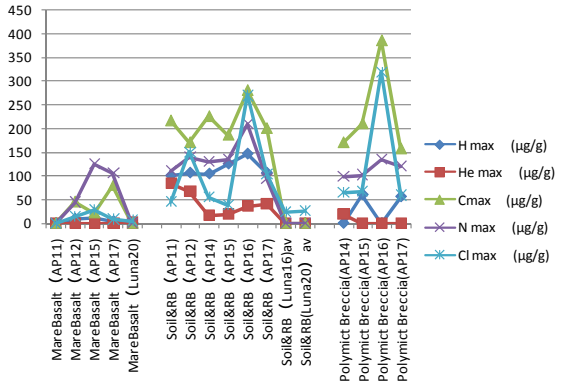

Fig.1 Five elements of H, He, C, N and Cl of three kinds of the Apollo lunar samples [1, 2]. Only C and Cl can remained at polymict breccias during impact process [2].

Impact elements C and Cl in the Mare basalts: The highest amounts of C and Cl of the polymict breccias in the Apollo lunar samples [1, 2] indicate that carbon and chlorine found in the crust of Earth can be remained in deeper lunar basalts [2] during giant impact event [1].

Remnant of terrestrial crust in the Moon: The lunar anorthositic crust is considered to be remnant of primordial Earth during giant impact process [1], which can be explained without terrestrial plate tectonics, earthquake and volcanism [2, 3, 4].

Summary: The lunar crust with anothositc compositions is considered to be derived from primordial Earth during impact, which is found in C, N and Cl elements of lunar basalts.

References: [1] Heiken G., Vaniman D. & French B. (1991): Lunar source book (Cambridge Univ.Press). p.468-474. [2] Miura Y. (2009): LEAG-2009 (in this volume), abstract #2049. [3] Miura Y. (2009): *LPS XL*, Abstract #1090. [4] Miura Y. (2009) *LPS XL*, Abstract #1468. [5] Miura Y. (2008): LPI Contrib. No. 1439.CD#3001. [6] Miura Y. (2008): LPI Contrib. No. 1446, CD#4047.