Study of siderophile elements (FeNi) in impact crater and geological boundaries

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Siderophile elements (Fe-Ni)-bearing minerals are found in natural impact craters and artificial impact experiments, where Fe-Ni rich particles can be formed by impact process. First Ni-rich particles (94 percent Ni) with 50 micrometer in size, is found all the surface and drilled core of 300m in depth at the Miura (Kagawa-Takamatsu) crater in Japan. Source of Ni by impact is also supported by fact that there is few sulfur and few Mg in silica-rich rocks of granites. FeNi-rich grains can be found K-T , P-Tr and T-J geological boundaries in glassy spherules or grains. As Fe-Ni-rich spherules are found by Nio meteroite showering and several sea-bottom, FeNi-rich grains in glassy spherules or fragments are formed by impact on crustal rocks.

Characteristic indicator of impact event in rocks and minerals can be summarized as follows: a) Siderophile-element anomalies of Fe, Ni, Pt, Ir and Os elements. Bulk chemical compositions equivalent to compositions of mixed local bedrock types. b) Shocked quartz or lechatelierite of glassy states.

Among them glassy rocks and minerals are easily changed by increased temperature of

crustal activity after impact. In fact, it is very difficult to find shocked glassy rocks in active volcanic islands. On the other hand, special elements of impact process can be found in siderophile elements because almost all meteorites contain siderophile elements which mainly can be found at deeper place of the planet Earth as follows. Major amount of siderophile lelemetmst: Fe and Ni (and Co) Minor or trace amounts of siderophile elements: Pt, Ir, Os etc.

From Apollo lunar rock data, anomalies of siderophile elements are found in Ni, Au, and Ir, and mainly on lunar highland of breccias rocks (compared with mare basalt of igneous rocks).

Therefore, the followings are main purpose in this paper:

a) To make data-base of lunar and asteroid surface-materials from the planet Earth (in this case, Mien, Ries and Takamatsu craters).

b) To make clear characteristics and main source of Ni and Fe-Ni particles on the surfaces of Earth, the Moon, Mars and Asteroids. c)To make report of new particles of Ni (within 50 micrometer in size).

Fe-Ni minerals are found in metal phases of meteorites as follows: Kamacite, taenite and tetrataenite as original Fe-Ni metal phases. End members of Fe and Ni elements are difficult to find in original meteorites. If this metal is found in the samples with Fe-Ni particles, this means that it mixes with second product of impact process.

There is Fe particle in many types of lunar rocks and terrestrial rocks, which is considered to be formed as follows:

Weathering from Fe-bearing rocks of granites can be found in this study.In order to decide the source of Fe-grains, it requires more information of occurrence and compositions of the rocks and minerals.