

**Micro to nanoscale observations of carbonaceous matters in 3.2 Ga Banded iron formations, Sheba Gold mine, Moodies Group, Barberton Greenstone Belt and >3.7 Ga schist, Isua Supracrustal Belt**

Y. OHTOMO<sup>1\*</sup>, R. NAKAJIMA<sup>1</sup>, T. OTAKE<sup>1</sup> AND T. KAKEGAWA<sup>2</sup>

<sup>1</sup> Faculty of engineering, Hokkaido University, Kita 13, Nishi 8, Kita-ku, Sapporo, Hokkaido 060-8628, Japan  
(\*correspondence: ohtomoy@eng.hokudai.ac.jp)

<sup>2</sup> Graduate School of Science and Faculty of Science, Tohoku University, 6-3, Aramaki Aza-Aoba, Aoba-ku, Sendai 980-8578, Japan

Carbonaceous matters in Archaean sedimentary rocks have been subject for early earth ecosystem studies, although the biogenicity is sometimes highly debated due to high alteration of the rocks. In this study, we performed microscopic observation and geochemical analysis on Archean carbonaceous matters affected by metamorphic/mineralizing fluids to understand alteration effects on them combined with geochemical data.

Examined samples of 3.2 Ga Banded iron formations, Sheba Gold mine, Moodies Group, Barberton Greenstone Belt affected by gold mineralizing fluid contain < 0.29 wt% of carbonaceous matters and the  $\delta^{13}\text{C}$  indicates  $\sim -27\%$ , suggesting biogenic origin. The carbonaceous matters are observed as aggregates of  $\sim 20\ \mu\text{m}$  round or oval flakes in diameter. Graphite-rich schists of > 3.7 Ga Isua Supracrustal Belt (ISB), West Greenland, contain < 8.8wt% of biogenic graphite and the  $\delta^{13}\text{C}_{\text{graphite}}$  shows heterogeneous values due to partial reaction with metamorphic fluids (Ohtomo et al., 2014). Most graphite grains are a few hundred nm in diameter, whereas a small proportion of graphite forms  $\sim 10\ \mu\text{m}$  aggregates on xenotime. Our observations suggest that most of the microscopic occurrences of carbonaceous matters are consistent with geochemical data, whereas partial features reflect alterations during metamorphism.

[1] Ohtomo *et al.* (2014) *Nature Geoscience*, 7, 25–28.