

## Geochemistry and TEM observation of graphite in 3.8 Ga metasedimentary rocks in Isua Supracrustal Belt, West Greenland

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The remnant of oldest life was reported only from one outcrop at the 3.8Ga Isua Spracrustal Belt (ISB), West Greenland, although graphite-bearing rocks are located at several spots in the Isua area. New outcrops of graphitic schist, which contain graphite up to 8.8 wt %, were found through the course of this study. The graphitic schist is interbedded with banded iron formation and extended for approximately ca. 250m from NW to SE. The graphitic schist consists mainly of graphite-rich layer and quartz-rich layer with a few micron meter thickness. Biotite-quartz schist, formed outcrop in ca. 5x10 m<sup>2</sup>, contains graphite up to 1.5 w%. Major and trace element were determined on samples of graphitic schist and biotite-garnet schists. Carbon isotope compositions of graphite were determined using the laser micro probe system. TEM analyses were also performed on the extracted graphite samples.

CI chondrite-normalized REE patterns of the new graphitic schist are similar to other Archean shales or banded iron formation. Therefore, new graphitic schist and biotite-quartz schist have characteristics of marine clastic to chemical sediments.

Carbon isotope compositions of graphite were determined on 50 samples. Their compositions range from -22.4 per mil to -13.2 per mil. The carbon isotope compositions change systematically, correlated to geological occurrence of graphitic schist. Lightest carbon isotope composition was found in the most western area where complicated nano-scale textures of graphite were observed by TEM. Some aggregates of graphite grain, were observed, which have a lot of strain. The heaviest carbon isotope composition was found in the most eastern area. This carbon isotope shift is probably due to the more metasomatic effect compared to the western samples. Considering those all geochemical data, graphite in new graphitic schist also gives another evidence of 3.8Ga marine biota.