SEG 2017 Conference

# Genesis of the Nabeba-Cabosse iron deposit, northwestern Republic of Congo

Chesther Ebotehouna Gatse*, Yuling Xie, Richen Zhong

*University of Science and Technology Beijing, Beijing, P.R. China, 100083, Beijing, China, Email: ebotehouna@yahoo.fr

The Nabeba-Cabosse iron deposit is located in the Souanké district inthe northwestern Republic of Congo. The deposit is situated in the Archean Ivindo greenstones belt at the western edge of the Sembe-Ouesso basin in the Congo Craton. The belt is predominantly made up of Archean rocks and these were partially reworked andsubjected to regional metamorphism. Limited geological studies have been carried out, and this deposit is interpreted as a product of enriched BIF that was precipitated at the sea floor. We provide new optical microscopic and SEM/EDS (Scanning Electron Microscopie/ Energy Dispersive Spectroscopy) observations, which suggestthat the protolith of the host rock might have an intrusive magmatic origin and hypogenic hydrothermal overprint might have played a significant role in iron upgrading.

The Nabeba-Cabosse Iron deposit is is located in northwestern Congo Craton. The area is mostly covered by Mesoarchaean metamorphic rocks including banded-iron formations, granitic gneiss, and amphibolites. The protolith of the Archean has been referred to as granite and volcano-sedimentary rock. The intrusive rocks in this area include granite, pegmatite, and diabase. No geochronological and geochemical results have been published on this granite pluton. Vertical zonation of the orebody is recognized, including an alumina-rich zone near the surface (17% of the total resource), a supergene high-grade zone (47% of the total resource), a sub-grade high-alumina zone (12% of the total resource), a transitional zone (20% of the total resource), and a high-phosphor zone with high Fe (62.4%) and low silica and alumina content at the bottom.

The samples for this study are banded iron ore collected from three different locations. The ores are hosted in amphibolites and consist of magnetite, hematite, and large amounts of secondary martite/hematite, goethite, and specularite. Minor amounts of fluorapatite, apatite, xenotime, monazite, magnesioferrite, and andebergite are also observed by SEM/EDS. The fluorapatite and magnesioferrite are normally of magmatic origin and primary minerals. Alteration shows characteristic zonation from the intrusive granite, through high-gradeore, and into subeconomic BIF, which may imply fluid-rock interaction between a magmatic fluid and BIF. In the BIF samples, monazite and xenotime-(Y) are found filling microfractures within quartz grains, which showwavy extinction and granoblastic texture with intergranular triple junctions, indicating infiltration of a post-metamorphic fluid. This fluid might be responsible for the enrichment of the BIF, and for monazite and xenotime-(Y) accompanying secondary ferric oxides, which replacegangue minerals such as quartz. Taken that monazite and xenotime-(Y) are commonly formed in high temperature magmatic fluid environments, the enrichment of BIFs is probably related to magmatic events.