

Geochemistry and Depositional conditions of the Paleoproterozoic oolitic iron formations, Bijawar basin, Bundelkhand craton, Central India

**PAL SUSHREE SANGITA^{1,2}, TEEDA VIJAYA KUMAR¹
AND BULUSU SREENIVAS³**

¹CSIR-National Geophysical Research Institute

²Academy of Scientific and Innovative Research (AcSIR)

³CSIR-National Geophysical Research Institute Hyderabad
500007, India

Presenting Author: sushreepal1995@gmail.com

The Paleoproterozoic period witnessed several vital changes in Earth history. Great Oxidation Event (GOE), global orogeny, Lomagundi $\delta^{13}\text{C}$ excursions, Snowball Earth conditions, and organic evolution – all took place during this crucial time window. The southern margin of Paleoproterozoic to Neoproterozoic Bundelkhand craton witnessed the development of the Bijawar basin (2.4 Ga – 1.6 Ga), which has deposited during the Paleoproterozoic records some of these significant events. Clastic sediments, chemically precipitated sedimentary rocks, phosphorites, and intrusive rocks are the dominant lithologies that constitute the Bijawar Group, which is sandwiched between Archean Bundelkhand basement (3.3 Ga-2.4 Ga) and Vindhyan supergroup (1.6 Ga-0.5Ga).

Here we report the discovery of an oolite iron formation and describe their petrological and geochemical characters. We have identified the concentric oolites through microscopic and scanning electron microscopic (SEM) studies. Microscopic and SEM images show that the formation has a typical granular structure consisting of concentric microbands (~0.01 - 0.12 mm thick) of iron and silica around silica-rich core. Granules show much variability in both size and shape. Different types of granules observed in the IF can be subdivided into ooids and peloids. SEM-EDS analysis confirms that alternating concentric layers are dominantly composed of iron and silica-rich minerals. The major element geochemical compositions of these rocks show high content of Fe_2O_3 and SiO_2 along with moderate range of Al_2O_3 & MgO . Such petrographic and geochemical characters indicate that they are associated with detrital deposits and were precipitated directly from a high-energy shallow marine environment. The PAAS normalized REE patterns show positive anomalies of Ce and Eu, which reflects possible hydrothermal source of Fe in these chemical sedimentary rocks. These concentric granules resemble a typical shallow marine iron-rich oolite structures. The composition of alternating layers of these oolites reflects their chemo-lithogenic origin. These IFs from the Bijawar Group may constitute the part of the Paleoproterozoic Granular Iron Formations (GIFs) from India.