

Magnitude of Precambrian impact experienced by native iron sample through High-pressure Mössbauer Spectroscopy

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Native Iron sample obtained from Proterozoic Mica schist of Chaibasa Shingbhum craton of Eastern India was studied by Mössbauer spectroscopy at ambient conditions. The Mössbauer parameters – isomer shift and magnetic hyperfine field, both correspond to the Fe⁰ ions present in the sample. To study the nature of the impact on the sample, high-pressure Mössbauer spectroscopic studies were carried out on the sample using Diamond anvil cell with 4:1 methanol:ethanol mixture as hydrostatic pressure medium up to 10 GPa [1]. Isomer shift remains almost constant up to ~5 GPa then shows continuous decrement. At ~9 GPa, onset of an extra peak is visible. Detailed study on the metallic iron (BCC structure) under high pressure using Mössbauer spectroscopic technique indicated continuous decrease in the isomer shift up to 13 GPa at which a sudden change corresponding to BCC→HCP transformation associated with appearance of an extra peak is observed [2-4]. Comparison of this parameter of native iron with metallic iron suggests the magnitude of the Precambrian impact experienced by the sample is about 6 GPa. The onset of extra peak at 9 GPa also confirms independently the impact origin of the sample, representing the Precambrian impact in the studied region.

[1] Chandra (2007) *Ind. J. Pure & appl. Phys.* **45**, 790.

[2] Chandra *et al.* (2005) *Hyper. Int.* **163**, 129. [3] Pipkorn *et al.* (1964) **135**, 1604. [4] Ingalls *et al.* (1967) *Phys. Rev.* **155**(2) 566.

Terminal Ediacaran oceanic anoxia: Evidence from framboidal pyrites in the cherts of Laobao Formation (South China)

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The terminal Ediacaran strata at the deep-water facies along the southeast margin of Yangtze Block are composed of black rock series which are dominated by cherts and siliciclastic sediments. The suite of chert rocks, correlated with the contemporary Dengying Formation (ca. 551 ~ 542Ma) on the carbonate platform, widely spreads into a 1600-km belt in South China.

Laobao Formation at Silikou section, North Guangxi is composed of ca. 169-meter thickness of chert rocks with thick bedded cherts in the lower part and with bedded cherts increasing mud components into the upper part. Framboidal pyrites are prevalent in these chert rocks, and ten samples from the lower and upper unit were investigated for their sizes and distributions. Results show that these framboidal pyrites are dispersed and mainly in small sizes. The maximum framboid diameters in these samples are generally between 7.7 to 18 μm and are no more than 20 μm . The mean values of framboid diameters are less than 5 μm for the seven samples from the lower unit and around 6.5 μm for the three samples from upper unit. In addition, of framboids, more than 85% in the seven samples from the lower unit and ~65% for the three samples in the upper unit are less than 7 μm ; only < 4% framboids in most chert samples are >10 μm .

The small grain sizes of these framboidal pyrites preserved in the Laobao cherts together with their narrow size range are well consistent with that they were formed in an euxinic water column, implying that the deep water in the Nanhua (South China) Basin was probably euxinic in the terminal Ediacaran. Mean and median values of framboid diameters and maximum diameters increased gradually upward the section, probably implying that the deep water of the basin was gradually oxidized when entering into the beginning of the Cambrian.