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Mineral chemistry, *P-T* pseudosection and in-situ U-Th-Pb_{total} monazite geochronology of Banded Iron Formation from Bundelkhand craton North-Central India, and its geodynamic significance

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The Banded Iron Formation (BIF) in Bundelkhand craton (BuC) occurred as supracrustals associated with TTG's, amphibolites, calcisilicate rocks, and quartzite within the east-west trending Bundelkhand tectonic zone (BTZ). The BIFs near Mauranipur do not show any prominent iron-rich and silica-rich layer band and are composed of garnet, amphibole, quartz, and magnetite. The volumetrically dominant monoclinic-amphiboles are grunerite in composition. X_{Mg} of grunerite varies between 0.39-0.37. The garnets are Mn-rich, the X_{Spss} of garnet ranges from 0.26-0.20, X_{Pyp} and X_{Grs} vary between 0.10-0.06 and 0.07-0.05, respectively. *P-T* pseudosection analysis indicates that by destabilizing iron-silicate hydroxide phases through a series of dehydration and decarbonation reactions, amphibole and garnet stabilized in BIF at temperature 400-450°C and pressure 0.1-0.2 GPa.

Massive type BIFs have monazite grains that vary from 10 to 50 μm in size, yield three distinct U-Th-Pb_{total} age clusters. 10-20 μm sized monazite grains yield the oldest age, 3098 \pm 95 Ma. 2478 \pm 37 Ma average age is obtained from the second group, which is relatively larger and volumetrically predominant. The third age group of Monazites gives an age of 2088 \pm 110 Ma. ~3100 Ma monazite suggests the older supracrustal rocks of Bundelkhand craton, similar to those obtained from Singhbhum and the Dharwar craton. The 2478 \pm 37 Ma age is constrained as the timing of metamorphism and stabilization of BuC. The third age group, 2088 \pm 110 Ma probably associated with renewed hydrothermal activities, leading to rifting and emplacement of mafic dykes in BuC.