

## **Petrology and geochemistry of ferrosyenite from Gundlapalle in the Cuddapah intrusive province, peninsular India.**

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Unlike the other alkaline and subalkaline rocks of the Cuddapah intrusive province in Peninsular India, the ferrosyenite is a rare and unique rock type and one such occurrence is found exposed at Gundlapalle (16°24'26"N:79°52'17"E-16°25'30"N:79°52'18"E) which is at a distance of 12 km from Piduguralla (Lime city) in the Guntur district of Andhra Pradesh, southern India. This well exposed pluton is spread over an area of around 3 km<sup>2</sup> on the western side of Gundlapalle village. The ferrosyenite has a sharp contact on the western side with Narji limestone and Panyam quartzites of the Palnad sub-basin of Kurnool group and on the eastern side with the Dharwar granites.

Megascopically the rock is medium to coarse grained and appears mesocratic due to the presence of dark grey coloured alkali feldspars. On the northern side of the pluton the ferrosyenite shows random orientation of laths of alkali feldspars with sub-vitreous luster. Under the microscope, this equigranular hypidiomorphic rock is composed of ferrohedenbergite, alkali feldspar (microcline mesoperthite) as essential minerals. Hornblende, quartz, biotite, calcite, sphene occur as accessory minerals. It should be mentioned here that the rock shows extensive hydrothermal alteration of ferrohedenbergite to nontronite which appears in golden brown colour within the skeleton pyroxene crystals.

From the geochemical point of view, the subalkaline ferrosyenite is deficient in Mg and has a low to moderate concentration of Rb, Sr, Zr, Cs, Ba and REE. As mentioned already, the ferrosyenite has been subjected to hydrothermal alteration as evident from the appearance of secondary mineral nontronite. Due to the conspicuous presence of Fe-rich pyroxene ferrohedenbergite, and the paucity of hydrous mafic minerals, it is possible to infer that the syenite magma was anhydrous which crystallized under reducing low fO<sub>2</sub> condition.