

## Sequential Development of Microstructures in Quartzites of Champaner Group, Gujarat

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### Abstract

The meta-sedimentary rocks belonging to Mesoproterozoic Champaner Group are exposed in the eastern extremity of Gujarat State, India. These rocks are characterised by argillaceous, chemogenic and organogenic compositions and surrounded by younger Godhra granite from three sides. The granitic intrusion resulted in the development of microstructures in quartzites particularly in the western and central region of the Champaner Group. The microstructures formed in quartzite include bulging recrystallisation (BLG), sub-grain rotation recrystallisation (SGR) and grain boundary migration recrystallisation (GBM). The grain boundary area reduction (GBAR) process is observed towards the eastern margin of Champaner Group, near granite contact. In spite of grain boundary area reduction, the quartz grains in quartzite replicate dislocations in the form of undulose extinction. This indicates that during microstructure generation the temperature was extremely high. However, prevailing high strain rate within grains during microstructure generation decreased the internal free energy and removal of dislocation from the mineral. Under microscope, quartzites reveal granoblastic, polygonal, mosaic or foam micro-textures size. The inequigranular quartz grain boundaries ranges from seriate to straight depending on its proximity to granitic intrusion. The quartz grains are associated with minor mica minerals like muscovite and biotite. Presence of occasional tourmaline in quartzites, in close proximity to granitic intrusion, indicates effect of boron metasomatism.

**Keywords:** Microstructures, Quartzite, Champaner Group, Godhra granite, Gujarat