



Origin of Intergrowth Textures in Koheda Pink Granite, East of Hyderabad City, India: Implications for Autometamorphic Conditions

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Abstract: The Intergrowth textures occurred in Koheda Pink granite (KPG) pluton is perthitic, myrmakitic and granophyric, and the main characteristic feature of the granite is Porphyritic where orthoclase phenocrysts are enclosed in matrix of quartz and plagioclase. The perthitic intergrowths are characteristics of autometamorphic origin and the myrmakitic and micrographitic are simultaneous intergrowths due to solid state reaction.

Keywords: perthite, crystallization, granitoids, intergrowth

1. Introduction

Granitoids are the wide range of felsic plutonic rocks, possess important diagnostic characters. They are most dominated rock type in the continental crust, hence they show variety of textural features among them intergrowth textures have quit significance. Petrographical analysis and interpretation of textural features of Granitoids are fundamental and vital in understanding the magma chamber fluid dynamics, they are key evidence of the crystallization and also the post- crystallization history of rocks. The present study is intended to understand the crystallization process, at particularly to know the conditions under which the intergrowth textures originated.

2. Field and Petrographical characteristics of KPG:

The KPG is a part of the Hyderabad granite batholith (HGB) of peninsular India. The region of HGB largely consist of wide variety of granitic rocks represented by tonalite-trondjemite-granodiorite (TTG) gneisses, granodiorites, quartz-diorites, and granitic plutons, all these rocks shows mineralogical, textural and compositional heterogeneity. The granite is porphyritic has been cropped out to the east of the Hyderabad city, near Koheda village. It occupies an area about 3. sq. km. surrounded by grey granite.

The granite body consists of course grained phenocrysts of feldspars (7cm length X 3cm width) with micro fractures. Quartz veins, small factures are common. The granite hosts for felsic enclaves (aplitic), which angular in shapes and varies up to 150cm X 60cm in dimensions. In the southern side of the body, magmatic lineation and foliation of mafic minerals are profusely seen, especially at the contacts with grey granite. Aplitic (70 cm width), pegmatitic and quartz veins are common.

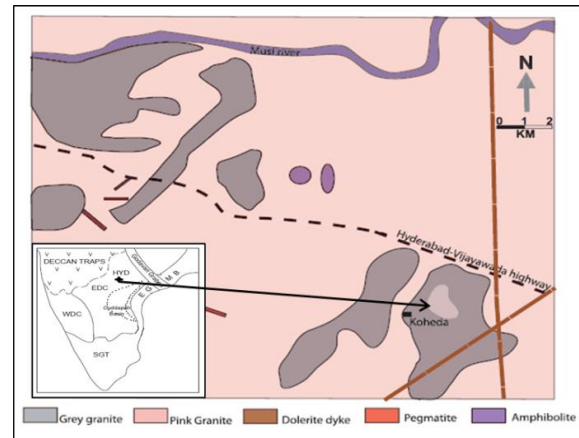


Figure 1. Geological map of the east of the Hyderabad city, Telangana state

The KPG is holocrystalline, coarse grained essentially consists of quartz, K-feldspar, plagioclase and perthites with accessory phases of biotite, fluorite, amphiboles, sphene, zircon and other opaque minerals. Various types of intergrowth textures are observed. Among these Intergrowth textures, myrmekite, perthite and micrographitic are most common. Quartz is anhedral, fine-coarse in grain size whereas fine grains are due to devitrification. Alignment of fine grained recrystallized quartz as an interstitial phase along the boundaries of phenocrysts show granulation characteristics. Quartz is also observed with undulose extinction and quenched into phenocrysts of perthite, orthoclase, and fluorite. Clusters of mafic minerals including amphiboles (alkali?), biotite and opaques are abundantly wide spread (Fig. 2b). The presence large sized fluorite is conspicuously seen with quartz inclusions (Fig. 2a).

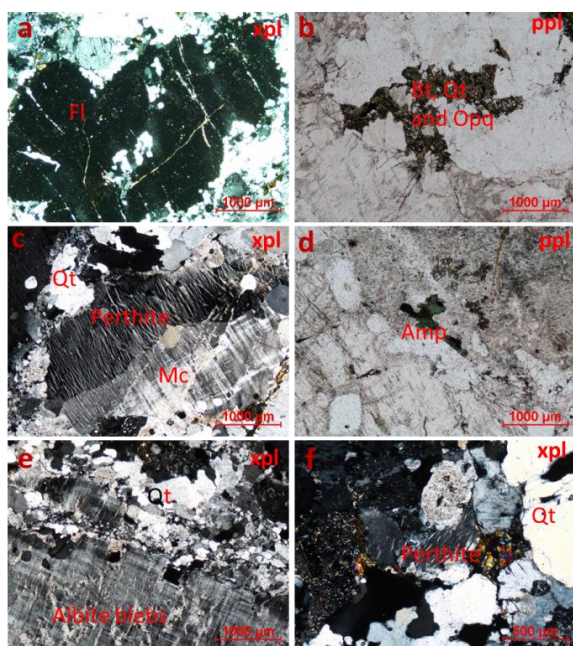


Figure 2. Microphotographs. (a) Fluorite phenocryst with quartz inclusions and fractures. (b) Biotite, quartz and opaques clusters in ppl. (c) Coarse, anhedral perthite and microcline exsolution. Myrmekitic intergrowths (bottom middle). (d) Amphibolite (alkali?) in ppl. (e) Devitrified quartz along the feldspar grain boundary. Albite blebs can be seen within feldspar phenocrysts. (f) Intergrowth of perthite and micrographic (above perthite).

Most K-feldspars are euhedral and show characteristic microcline twinning with solid state deformation features (Fig. 2c). Granophyric textures such as myrmekitic and micrographic are observed along phenocrysts of plagioclase and alkali feldspars respectively. Perthites occur as strings, vein and microcline perthites (Fig. 2d & e).

3. Discussion and Conclusion:

Simultaneous growth of granophyric textures such as myrmekitic and micrographic are observed along phenocrysts of plagioclase and alkali feldspars respectively due to solid state reaction and the perthites are possible exsolved in solid state conditions. The process of crystallization does not necessarily cease when the magma becomes solid as long as temperature is high enough, recrystallization and both chemical and textural re-equilibration takes place (winter, 2010). In the present study feldspars that crystallized in magma are alkaline in nature which show mixtures of exsolved K-rich and Na-rich phases, later perthites formed due to replacement process in autometamorphic condition.

References

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Abbreviations: Fl: Fluorite, Bt: Biotite, Qt: Quartz, Amp: Amphibole, Opq: Opaque, xpl: cross polarised light, ppl: plane polarised light.