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Identifying parameters on genesis of coronal phases at olivine-plagioclase contact: A comparison from different geological terrane

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Corona texture between olivine-plagioclase is a common phenomenon in metabasic rocks and has been reported from different geological terrane of the world. However, the documented coronal phases from these terrane show significant variation in terms of number and composition. In this study, we have tried to explore the effect of different parameters like pressure, temperature, reactant bulk composition, availability of fluid, chemical potential gradient etc. on the genesis of such distinct coronal minerals. To address this question, we have compared three coronal assemblages developed between olivine and plagioclase from published literature (Gallien et al. 2012; Banerjee et al. 2019; Adak & Dutta, 2020). These three samples represent different terrane and have distinctly separate geological evolutionary history that led in formation of the texture. The samples are – i) #CGGC, a mafic intrusive from Chotanagpur Granite Gneissic Complex, India (Adak & Dutta, 2020); ii) #GTSI, an olivine bearing mafic dyke from Granulite Terrane of South India (Banerjee et al. 2019); and iii) #VFH, a troctolitic gabbro from Valle Fértil and La Huerta range, Argentina (Gallien et al. 2012). The layers in coronae of #CGGC and #GTSI are defined by three phases of separate composition; orthopyroxene and amphibole are common, but #CGGC contains spinel and #GTSI contains magnetite. Whereas, #VFH contains four phases, clinopyroxene in addition to orthopyroxene, spinel and amphibole. Besides evaluation of reactant composition and their effect, our methodology also incorporates Schrienemaker's analysis through P-T and chemical potential diagrams. Considering the chemistry of both the reactant and product phases we have used a simplified CMASH system and calculated $\mu CaO–\mu H_2O$, $\mu MgO–\mu H_2O$, $\mu CaO–\mu MgO$ diagram along with petrogenetic grid for each sample. The results show that along with change in P-T, factors like initial composition of the reactant minerals, behaviour of the system during reaction (open/closed) and P-T-t path of evolution also play significant role in determining the products in coronae formed from the reactant olivine and plagioclase.