Vander Auwera J, Longhi J & Duchesne JC:

Some results on the role of P, T and fO_2 on ilmenite composition

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Experimental data performed in anhydrous conditions from 1 atm (fO_2 at NNO, FMQ-1 and MW-2.5) up to 13 kb (FMQ-2, FMQ-4) on the so-called Tjörn (TJ) primitive jotunite (Vander Auwera and Longhi, 1994) are used here to assess the possible role of pressure, temperature and fO_2 on ilmenite composition (Al, Mg, Cr). In Rogaland, it has been shown that the parent magmas of the Åna-Sira massif-type anorthosite and the layered mafic intrusion of Bjerkreim-Sokndal, which both contain ilmenite deposits (Duchesne, 1999), are generally similar to this primitive jotunite (Duchesne and Hertogen, 1988; Vander Auwera and Longhi, 1994; Vander Auwera *et al.*, 1998; Longhi *et al.*, 1999). These experimental data can thus bring information concerning the behaviour of poisonous elements like Mg and Cr during polybaric crystallization of ilmenite in anorthosite complexes.

In the TJ primitive jotunite, ilmenite is a near liquidus phase and experiments corresponding to the first appearance of this phase at a given pressure have been selected in order to limit the extent of liquid compositional variability. These experimental data indicate that the most important effects are an increase of D_{Al2O3} (Ilm/liq) with increasing fO_2, a slight increase of $D_{Fe/Mg}$ (Ilm/liq) and a decrease of ilmenite Cr_2O_3 content with increasing pressure. Nevertheless, this latter effect could result from the earlier appearance of opx with increasing pressure which decreases liquid Cr content. Besides that, there is no significant variation of D_{MgO} with increasing pressure and D_{Al2O3} only slightly increases.

These experimental data thus suggest that the compositional variability observed in ilmenites from different orebodies (Duchesne, 1999) probably result from variable parent magmas composition and/or subsolidus readjustments (Duchesne, 1972).

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