Mg-Fe PARTITIONING BETWEEN PLAGIOCLASE AND BASALTIC LIQUIDS

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Plagioclase is one of the most important minerals in partitioning studies, not only because of it omnipresence as a liquidus phase in various magmatic systems, varying from terrestrial and lunar rocks, to some meteoritic magmas, but also for being a good candidate for retaining its original crystallized trace elements contents due to the slow character of CaAl-NaSi interchange.Because trace element models are highly sensitive to the values chosen for the distribution coefficients; a poor understanding of the factors which control these values can lead to wholly erroneous interpretations. More rigorous investigations of relationships between intensive variables and trace element partition coefficients are needed.Here we present a compilation of data of the compositions of plagioclase and coexisting glass from both natural and experimental samples. We also evaluate the role of composition, temperature and oxygen fugacity on the partitioning of Mg and Fe between plagioclase and Plagioclase plays an enigmatic role in the differentiation of MORB and it is one of the dominant mineral in gabbros. It has approximately the same density as MORB liquids and potentially has a more complex fluid dynamic behavior during the crystallization of MORB than do olivines or pyroxenes. Because Mg behaves as a trace element in plagioclase, it may record the Mg concentration of the initial, parent liquid. Similarly, ferric and ferrous iron may have different partition coefficients, and the partition coefficient of total Fe can be used as an indicator of the redox state of the magma.We attempt to establish a simple thermodynamic model for Mg and Fe partitioning between plagioclase and basaltic liquids. Finally, we consider some geochemical applications.