Department of the Interior

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Bibliography on Trace-Element Partitioning Studies

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This bibliography was compiled by Eero Hanski and underwent minor editing in the hands of Gerald Czamanske. The bibliography is considered complete through mid-1989. The style of the bibliography does not conform with current USGS bibliographic standards. Information given is adequate for article retrieval, but users are cautioned to completely verify citations prior to incorporation into derivative reference lists. In many cases where elements studied are not noted in reference titles, a list is provided in parenthesis as part of the citation.

D values have been determined in the cited studies for the following phases: silicates, oxides, carbonates, sulfides, volatile-bearing fluids, and salts. These can occur as liquids or solids. (Solid silicate-silicate partition coefficients have been omitted.) Methods utilized in D determinations are experimental or empirical, most often using phenocryst/groundmass pairs. There exist many tables of D values in the literature where some of the D values have been calculated from mineral/mineral partitioning data, estimated from the general behavior of the elements, or have been purely guessed. These "determinations" have been omitted in this compilation. Some papers containing a critical review of existing D data have been included (e.g., Frey et al., 1978). Also some papers dealing with theoretical aspects of element partitioning (e.g., Philpotts, 1978) have been accepted.

The focus in this bibliography is on trace-element partitioning studies. There is, however, a problem in the designation of elements as major or trace elements. An element can be a major component in some phases and a minor or trace element in other phases (for example, Mg and Fe are trace elements in plagioclase, but major elements in pyroxenes). Na, K, Ti, which are generally regarded as major elements. behave in many systems as trace elements. Analyses of these elements together with other "major" elements (often also Cr) in liquids and coexisting mineral phases have been reported in many experimental studies (not cited in the bibliography). Reviews of these studies are

given by:

Drake, M. J., 1976, Plagioclase-melt equilibria. Geochim. Cosmochim. Acta, **40**, 457-465.

Nielsen, R. L., Drake, M. J., 1979, Pyroxene-melt equilibria. Geochim. Cosmochim. Acta, **43**, 1259-1273.

Nielsen, R. L., Dungan, M. A., 1983, Low pressure mineral-melt equilibria in natural anhydrous mafic systems. Contrib. Mineral. Petrol., **84**, 310-326.

Because the bibliography contains, for example, the studies of partitioning of Al and Ti between pyroxene and melt by Akella and Boyd (1973), it should have been logical to include also more recent studies of "major" element partitioning such as (in addition to the review papers above and references mentioned in them):

Delano, J. W. (1980, Proc. Lunar Planet. Sci. Conf. 11th, 251-288); Esperanca, S., Holloway, J. R. (1987, Contrib. Mineral. Petrol., **95**, 207-216); Falloon, T. J., Green, D. H. (1987, Contrib. Mineral. Petrol., **37**, 181-219); Gee, L. L., Sack, R. O., (1988, J. Petrol., **29**, 1233-1255); Grove, T. L., Bryan, W. B. (1983, Contrib. Mineral. Petrol., **84**, 293-309); Grove, T. L., Gerlach, D. C., Sando, T. W. (1982, Contrib. Mineral. Petrol., **80**, 160-182); Mahood, G. A., Baker, D. R., (1986, Contrib. Mineral. Petrol., **93**, 251-264); Maurel, C., Maurel, P. (1982, Bull. Mineral., **105**, 197-202); Maurel, C., Maurel, P. (1982, Bull. Mineral., **105**, 640-647); Maurel, C., Maurel, P. (1984, Bull. Mineral., **107**, 25-33); Maurel, C., Maurel, P. (1984, Bull. Mineral., **107**, 767-776); Sack, R. O., Carmichael, I. S. E. (1984, Contrib. Mineral. Petrol., **85**, 103-115); Sack, R. O., Walker, D., Carmichael, I. S. E. (1987, Contrib. Mineral. Petrol., **96**, 1-23); Tormey, D. R., Grove, T. L., Bryan, W. B. (1987, Contrib. Mineral. Petrol., **96**, 121-139).

Major element analyses of coexisting phenocrysts and groundmasses have also been published in numerous papers; for example, in many articles by I. S. E. Carmichael in the 1960's.

This report is being issued in two forms, representing slightly differing versions. Version A, issued as paper copy, incorporates all special diacritics. Version B, issued as a 5.25" IBM-compatible diskette, affords users the great benefit of an online bibliography but is formatted in the standard ASCII character set because of anticipated hardware and software problems associated with foreign alphabets.

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Akella, J., Boyd, F.R. (1973) Partitioning of titanium and aluminium in synthetic pyroxene compositions. Lunar Planet. Sci., IV, 21-23.

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Almukhamedov, A.I., Medvedev, A.Ya. (1982) Geokhimiya sery v protsessakh evolyutsii osnovnykh magm. Nauka, Moscow, 147 p. (V,Cr,Cu,Ni,Co)

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Apted, M.J. (1982) Control of loss of iron to platinum capsules and effect on samarium partitioning between garnet and melt. Am. Mineral., 67, 1069-1073.

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