MICROLITE-GROUP MINERALS FROM BRAZILIAN PEGMATITES

Daniel Atencio[1]
Marcelo B. Andrade[2]

[1]Instituto de Geociências, Universidade de São Paulo, São Paulo, SP, Brazil .
[2]Instituto de Física de São Carlos, Universidade de São Paulo, São Carlos, SP, Brazil

Microlite-group minerals belong to the pyrochlore supergroup. They are common in granite pegmatites. New nomenclature rules for the pyrochlore supergroup are being now introduced by a CNMNC-IMA subcommittee. Data for microlite-group minerals from Brazilian pegmatites are here discussed according to these new nomenclature rules.

The new nomenclature system (Atencio et al., in preparation) is based on ions in the *A*-, *B*- and *Y*-sites and results in mineral names of the type root-(xy) where root is the name of the group, determined by the dominant species of the dominant valency group at the *B*-site. Five groups are recommended, based on the atomic proportions of the *B*-atoms Nb, Ta, Sb, Ti, and W. The recommended groups are, respectively, pyrochlore, microlite, roméite, betafite, and elsmoreite. The determination of a proper group is made by the dominant valence at *B*, not by a single, dominant ion. That is, the numbers of all 4+ cations are summed to give a total number of M^{4+}, the numbers of all 5+ cations to give a sum M^{5+}, and so on. For this purpose, 'a group of atoms with the same valency state' are considered to be a single constituent (Hatert and Burke, 2008). The x indicates the dominant species of the dominant valency group at the *A*-site, and y indicates the dominant species of the dominant valency group at the *Y*-site.

Three microlite-group species were considered as Brazilian type minerals: bariomicrolite, uranmicrolite and fluornatromicrolite.

Bariomicrolite was described by van der Veen (1963) as an alteration product in a pegmatite near Chi-chico, São João del Rei county, Minas Gerais, but Chi-chico is an unknown locality. The mineral is probably from Nazareno, near São João del Rei. Originally named rijkeboerite, the mineral was renamed by Hogarth (1977) to conform to the nomenclature of the pyrochlore group approved by IMA. The type specimen apparently is too poor in Ba to warrant this name and has □ dominant at the *A* position and H_2O at the *Y*-position, and as such is probably microlite-(□H_2O). Unfortunately, the type specimen was not preserved. The bariomicrolite studied by Beurlen *et al.* (2005) is probably also microlite-(□H_2O).

Uranmicrolite was originally described as djalmaite by Guimarães (1939a, 1939b, 1941), in alluvium near the altered granitic pegmatite at Posse farm (São José mine), 1 km distant of Brejaúba town, Conceição do Mato Dentro county, Minas Gerais. The name djalmaite was officially discarded in favour of uranmicrolite, a name introduced by Strunz (1957), to conform to the new nomenclature system for pyrochlore group minerals, approved by CNMMN – IMA (Hogarth 1977). No samples described as uranmicrolite are rich enough in U to warrant status as a separate species. The sample studied by Guimarães (1939a, 1939b, 1941) is probably a zero-valent-dominant microlite.

The IMA Proposal 98-018 for fluornatromicrolite (Witzke *et al.* 1998) was approved but the complete paper was never

published. Some data were published by Atencio (2000). The mineral is from Alto Quixabá pegmatite, 3 km north-west of Quixabá, Frei Martinho county, Paraíba.

Other Brazilian analysis from the literature correspond to zero-valent-dominant microlite: the bismutomicrolite of Erichsen de Oliveira *et al.* (1970) and the plumbomicrolite, stibiomicrolite and natrobistantite of Beurlen *et al.* (2005).

New microprobe analyses for six Brazilian granite pegmatite occurrences of microlite-group minerals were obtained by Andrade and Atencio (in preparation). The occurrences are: 1) Morro Redondo, Coronel Murta, Minas Gerais; 2) Jonas (today Fiote), Conselheiro Pena, Minas Gerais; 3) Volta Grande, Nazareno, Minas Gerais; 4) Ipê, Marilac, Minas Gerais; 5) Ponte da Raiz, Santa Maria de Itabira, Minas Gerais; and 6) Quixabá, Frei Martinho, Paraíba. Microlite-(NaF) was identified at Morro Redondo and Quixabá, and microlite-(CaF) at Morro Redondo, Jonas and Volta Grande. It was not possible to know the dominant constituent of the *Y*-site for some samples: microlite-(Na) from Quixabá, and microlite-(Ca) from Ipê and Ponte da Raiz mines. One sample from Ponte da Raiz can be classified both as microlite-(Na) and microlite-(Ca). Microlite-($\square H_2O$) and microlite-(H_2OH_2O) were identified at Volta Grande pegmatite, and possibly correspond to the bariomicrolite of van der Veen (1963).

In conclusion, the complete description of microlite-(NaF), microlite-($\square H_2O$) and microlite-(H_2OH_2O) should be published and these will be the new Brazilian microlite-group type minerals. The names bariomicrolite, uranmicrolite and fluornatromicrolite were discredited.

REFERENCES

Andrade, M.B. and Atencio, D. (in preparation) Pyrochlore-supergroup minerals from Brazil.

Atencio, D. (2000) Type Mineralogy of Brazil. 1st. ed. São Paulo: Museu de Geociências – Universidade de São Paulo, Brazil. 114p.

Atencio, D., Andrade, M.B., Christy, A.G., Gieré, R., and Kartashov, P.M. (in preparation) Suffix-based names for the pyrochlore supergroup minerals.

Beurlen, H., Soares, D.R., Thomas, R., Prado-Borges, L.E., and Castro, C. (2005) Mineral chemistry of tantalate species new in the Borborema Pegmatitic Province, Northeast Brazil. *Anais da Academia Brasileira de Ciências,* 77: 169-182

Erichsen de Oliveira, O., Rocha Baptista, N. and Baptista, A. (1970): Westgrenita no pegmatito de Tromba, Estado de Goiás. *Anais da Academia Brasileira de Ciências,* 42: 41-44 (*in Portuguese*).

Guimarães, C.P. (1939a) Djalmaita, um novo mineral radioativo. *Annaes da Academia Brasileira de Sciencias,* 11: 347-350.

Guimarães, C.P. (1939b) Djalmaite, a new radio-active mineral. *Mineração e Metalurgia*, 4(19): 35-36.

Guimarães, C.P. (1941) Djalmaite, a new radio-active mineral. *American Mineralogist,* 26: 343-346.

Hatert, F. and Burke, E.A.J. (2008): The IMA-CNMNC dominant-constituent rule revisited and extended. *Canadian Mineralogist,* 46: 717-728.

Hogarth, D.D. (1977): Classification and nomenclature of the pyrochlore group. *American Mineralogist,* 62: 403-410.

Strunz, H. (1957) *Mineralogische Tabellen*. Akad. Verlag., Leipzig, 3rd. ed., 448p.

van der Veen, A.H. (1963) A study of pyrochlore. *Verhandelingen van het Koninklijk Nederlands geologisch mijnbouwkundig. genootschap, Geologische serie,* 22, 188 pp.

Witzke, T., Steins, M. Doring, T., Schuckmann, W., Wegner, R. and Pollmann, H. (1998) Fluornatromicrolite. *IMA CNMMN Submission 98-018.*