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## Polyoxoniobates from Cajati, São Paulo, Brazil

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Menezesite and melcherite are two polyoxoniobates described from the contact zone between dolomite carbonatite and “jacupirangite” (=a pyroxenite) at the Jacupiranga mine, in Cajati Co., São Paulo state, Brazil.

Menezesite is the first natural heteropolyniobate [1]. The second natural heteropolyniobate, aspedamite, isostructural with menezesite, was described in the Herrebøkasa Quarry, Aspedammen, Østfold, Southern Norway [2]. The simplified formula is  $(\square, \text{Ba}, \text{K})_{12}(\square, \text{Mg})_3\text{Zr}_4(\text{BaNb}_{12}\text{O}_{42}) \cdot 12\text{H}_2\text{O}$ . The end-member formula was originally expressed as  $\text{Ba}_2\text{MgZr}_4(\text{BaNb}_{12}\text{O}_{42}) \cdot 12\text{H}_2\text{O}$ , but it should be more correctly expressed as  $\square_{12}\text{Mg}_3\text{Zr}_4(\text{BaNb}_{12}\text{O}_{42}) \cdot 12\text{H}_2\text{O}$  [2]. It is cubic,  $Im-3$ ,  $a = 13.017(1) \text{ \AA}$ ,  $V = 2206(1) \text{ \AA}^3$ ,  $Z = 2$ . The structure is based on the heteropolyanion  $[\text{BaNb}_{12}\text{O}_{42}]^{22-}$ , which consists of twelve face- and corner-sharing  $\text{NbO}_6$  octahedra that surround the 12-coordinated Ba cation. This type of heteropolyanion was originally described by Dexter and Silverton [3].

Melcherite is the second natural hexaniobate [4]. The first one is peterandresenite [5] and the third is hanesmarkite [6], both from in Tvedalen, Larvik, Vestfold, Norway. Its simplified formula is  $(\text{Ba}, \text{K})_2(\text{Na}, \text{Ca})_2\text{Mg}[\text{Nb}_6\text{O}_{19}] \cdot 6\text{H}_2\text{O}$ . Chemical composition varies from  $\text{Ba}_2\text{Na}_2\text{Mg}[\text{Nb}_6\text{O}_{19}] \cdot 6\text{H}_2\text{O}$  to  $(\text{BaK})(\text{NaCa})\text{Mg}[\text{Nb}_6\text{O}_{19}] \cdot 6\text{H}_2\text{O}$ . It is trigonal,  $R-3$ ,  $a = 9.0117(6) \text{ \AA}$ ,  $c = 23.3986(16) \text{ \AA}$ ,  $V = 1645.64(19) \text{ \AA}^3$ ,  $Z = 3$ . The structure is based on the  $[\text{Nb}_6\text{O}_{19}]^{8-}$  anion, which consists of clusters of mutually 6 edge-sharing  $\text{NbO}_6$  octahedra forming a super-octahedron. This type of polyanion was originally described by Lindqvist [7].

### References:

[1] Atencio D et al. (2008) *Am Mineral* 93:81-87

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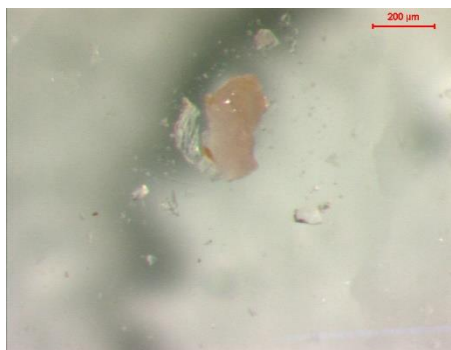
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*Figure 1: Melcherite from Cajati*

