

## **Mineralogical and geochemical study of pseudocoticules from the Stavelot Massif, Belgian Ardennes, and redefinition of coticule**

M. Baijot, F. Hatert, and A.-M. Fransolet

Laboratory of Mineralogy, University of Liège, Belgium (mbaijot@ulg.ac.be)

The term coticule designates an unusual type of rock used as whetstone, which has been extensively mined in the region of Recht-Vielsalm-Bihain (Stavelot Massif, Belgian Ardennes). It occurs as beige- to yellowish-coloured layers with a thickness of 1-10 cm, interbedded with purple metapelites of Lower Ordovician age. These metamorphic Mn-rich rocks contain abundant fine-grained spessartine crystals (5 to 20  $\mu\text{m}$  in diameter), dispersed in a matrix essentially composed of muscovite, with accessory quartz and chlorite.

Besides coticule *sensu stricto*, another type of spessartine-rich rock is also known in the Vielsalm-Salmchâteau area (Baijot *et al.*, 2011). These rocks occur as pinkish centimetre-sized layers interstratified with chloritoid-bearing schists, and contain large spessartine grains (up to 50  $\mu\text{m}$ ) embedded in a matrix essentially constituted by quartz. They are called pseudocoticule, and can not be used as whetstone due to the abundance of quartz. The aim of the present communication is to present a petrographic and geochemical study of pseudocoticules from the Salm Valley, in contrast to the “classical” coticules from the same area, and to confirm both the unusual geochemistry and genesis of these rocks.

The petrographic investigation of pseudocoticules from the Salm Valley shows that this type of rock is characterized by a quartz + spessartine + hematite assemblage. Spessartine grains can reach ca. 200  $\mu\text{m}$  in diameter. The rocks directly in contact with the pseudocoticules are very rich in chloritoid and spessartine, thus showing that metasomatic processes affected the pseudocoticules at the end of the Variscan orogeny. Geochemical data indicate that Fe is higher in the host rocks than in the pseudocoticules, whereas Mn shows the inverse behaviour. Cu shows a significant increase in pseudocoticules when compared to the host rocks, thus indicating that pseudocoticules may be the source for the enrichment in exotic trace elements (Cu, Te, Mo, Bi, and Pb) observed in the quartz veins of the Salm Valley. The term coticule is also redefined on an historical basis, as a yellow rock characterized by small spessartine grains ( $\geq 85$  mol. % Sps, 5-20  $\mu\text{m}$ ) included in a matrix containing large amounts of phyllosilicates. Whole-rocks analyses indicate  $(\text{K}_2\text{O} + \text{Na}_2\text{O}) \geq 1$  wt. % and  $\text{Al}_2\text{O}_3 \geq 15$  wt. %. Such a rock can be used as whetstone, whereas pseudocoticules, which contain larger amounts of quartz, do not show the same technical properties.

In the literature, the term coticule was frequently used to describe spessartine-bearing quartzites, or garnet-rich quartzites in general. The petrographic observations of the rocks from the Salm Valley, where the term coticule was historically defined, indicate that most of the “coticule” samples described in the literature rather correspond to pseudocoticules or to almandine-bearing quartzites.

### References:

Baijot, M., Hatert, F. & Fransolet, A.-M. (2011). Eur. J. Mineral. 23, 633-644.