Rapakivi texture in the Wiborg batholith

K.M. Larjamo [1], A. Heinonen[1]. and O. T.Rämö[1]

[1] *Department of Geosciences and Geography, Division of Geology and Geochemistry (DiGG), PO Box 64, Gustaf Hällströminkatu 2a, 00014, University of Helsinki*

*(*correspondence: kirsi.larjamo@helsinki.fi)*

The origin of rapakivi texture, the formation of plagioclase-rimmed alkali feldspar ovoids in particular, has drawn attention since rapakivi granites were first described by J. J. Sederholm in the late 19th century. Over a hundred years later there are still several competing genetic models: sub-isothermal decompression, magma mixing, and exsolution processes among the most popular ones.

This study comprises petrographic analysis of ∼60 ovoids from 6 different sample sites of the three major rapakivi types (dark wiborgite, wiborgite and pyterlite) of the *locus classicus* ∼1.63 Ga Wiborg batholith in southeastern Finland. The aim is to describe and compare petrographic features and determine chemical compositions of the alkali feldspar ovoids as well as the inclusion minerals.

All ovoids are perthitic and have concave and rod-like quartz, hypidiomorphic or slightly resorbed plagioclase (often with partial quartz rim), zircon, biotite, apatite, ilmenite and/or magnetite as inclusions. The ovoids of the more mafic rapakivi types have also hornblende and sometimes fayalitic olivine and clinopyroxene as inclusions while the more felsic types have abundant fluorite. Although the basic features of all ovoid types are the same, each sample location seems to have specific characteristics, for example ragged biotite, symplectitic hornblende or myrmekitic margins of plagioclase.

The studied ovoids fall into 3 main groups based on their margin texture: 1) ovoids with plagioclase rim, 2) ovoids with symplectic, "lace-like", quartz, and 3) ovoids interlocked with groundmass. Rock type or location does not seem to be significant (except for pyterlites that often lack plagioclase rims) as all three types may coexist almost next to each other in any single location. Plagioclase rims can be continuous or partial, and they may consist of a single grain or of numerous grains. They are antiperthitic and have small grains of quartz, fluorite, apatite, biotite, and sometimes also hornblende and zircon as inclusions.

It is noteworthy that the groundmass feldspars are clearly different from the ovoids: there are hardly any inclusions, and minor exsolutions, if present, are different. K-feldspar may be heavily twinned. These petrographic observations indicate that the ovoids crystallized not only from distinct magmas but most likely also in a varying (P-T) environment.