

occur in maar and poorly welded scoria deposits. The second includes glass-coated xenoliths that are found in welded bomb-rich deposits related to a feeder dyke that once it broke through the surface formed a fire fountain-type eruption.

The glass-coated xenoliths range from 1 cm up to 10 cm in diameter. The majority are rounded with some having folded on themselves. The colour of the glass coating varies from green to brown, and is on average less than a millimeter thick, except where the xenoliths are folded, or have drips at their base. In this case the glass coating can be up to 3 mm thick. Scanning electron microscope images show that the xenoliths can be divided into three zones. The first is the glass-coating that contains partly dissolved rounded quartz crystals and quench crystals of alkali feldspar and a few vesicles. The second zone contains more rounded quartz grains and vesicles with less glass. The third and innermost zone is made up of angular to subrounded quartz grains and broken down biotite grains that formed glass + oxides ± alkali feldspar ± cordierite. This zone contains the most vesicles of the three and the least glass. Veins are present in several samples, they run through zones two and three, and they appear to be the source of the glass in the outermost zone.

The glass coating is interpreted to have formed by the breakdown of biotite and reaction of the melt with the quartz grains in the xenolith. This was tested by experiments on similar Devonian sedimentary rock. The rock was heated in a furnace to temperatures between 1001°C and 1276°C for up to 180 minutes. The textures and mineralogy are similar to those observed in the samples from the volcano, supporting the hypothesis for the petrogenesis of these samples.

**The origin of glass-coated crustal xenoliths
from the Rockeskyllerkopf Volcanic
complex, West Eifel, Germany**

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The Rockeskyllerkopf volcano in the Quaternary West Eifel Volcanic field is composed of maar, spatter and scoria deposits, and lava flows that erupted at various stages throughout the volcano's history. The xenoliths that occur in the silica-undersaturated nephelinitic and tephritic lavas are clinopyroxenite + peridotite, as well as Devonian sedimentary and lower crustal rocks.

The quartz-rich Devonian sedimentary xenoliths are divided into two categories. The first includes unaltered xenoliths that