

The cross sections
and the geological
maps of the
vitrophyre rhyolite is
shown ab...

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Vitrophyre Rhyolite in Valles Caldera

Vitrophyre Rhyolite is a type of igneous rock found in the Sante Fe and Valles Caldera areas of New Mexico (see map). Rhyolites are the extrusive equivalents of the plutonic rocks and hence the Rhyolite outcrops closely resemble granite formations. They are composed of high content of Silica and low in iron and magnesium. The Rhyolite melts are intensely polymerized and their lavas are very viscous. The Rhyolites are also known to occur in volcanic plugs and dykes.

The Rhyolites of the Oligocene intrusives commonly contain 10 percent phenocrysts which are set in altered cryptocrystalline groundmass. A variety mosaic of grainy crystalline material make in the order of 0. 01 - 0. 1 mm across makes the groundmass. Certain specimens also have been found to have microgranophyric groundmass too. Some specimens also have brown glass groundmass containing microlites that are glow aligned. Quartz is present as euhederal grains that are partly resorbed. Plagioclase and potassium feldspar are also seen to be present consistently across all the specimens.

Reclits in a few specimens also indicate that plagioclase is albitized form an oligoclase or andesine. More of potassium feldspar is seen predominantly than orthoclase and at the same time it is not even determinable in a few specimens and sites. The chemical difference between vitrophyre and an altered devitrified rock which could be genetically related is found to be extremely difficult to interpret. The devitrified rocks contain lesser CaO and

Na₂O and more of SiO₂ and K₂O than the Vitrophyres.

The origins of can be traced back to the Owyhee Plateau closely where Idaho, Nevada and Oregon meet. The massive volcanism there started off as the yellow hot spot. With passage of time the North-America moved southwestward and the hotspot then cut across Northwest of Wyoming and southern Idaho that witnessed very recent volcanism less than a million years ago.

As the continent tripped over the hotspot, the formation of the adjacent zone as the crust of the earth pulled apart. There were too basic volcanisms that were involved - the eruption of the Rhyolites from the magmas with exactly the same composition as that of a granite with good silica and alkali components. The magmas had their origin in the earth's crust resulting in the granitic composition. The second volcanism was that of the basaltic origin. These magmas had their origin in the mantle and were hotter when compared to the rhyolitic magmas. Since the basaltic magma had its origin in the mantle that it is obvious that it is richer in iron and magnesium. Owing to its chemical composition the rhyolite magma is slow to crystalize on cooling. This is evident at the base of most of the rhyolite bodies that exhibit welded tuff layers and rhyolite lava flows. The most rapidly cooled bottom did not have an opportunity to crystalize and remained in a glassy state. This glassy form is called the vitrophyres. It is typically black and is in distinct contrast to slowly cooled interior rhyolite sheets that are brown to red in color and presentation. Despite a strong color difference both the parts are formed at similar times and from same magma source. " From a petrochemical point of view is a rhyolitewith an agpaitic index (AI) of 0. 92-0.

98 near toperalkalinity that is reached in successive comenditic units [7, 12, 13].”

About 16 million years before the Timber Mountain area is estimated to be a basin type block faulted mountains with low relief and separated by valleys of alluvium and tuff. The youngest among these tuffs - the calc-alkalic Fraction Tuff is a little more than 16 million years old. It then flowed into the ancestral valleys of the area from the vents in the North. The earliest volcanic activity in the caldera complex was seen to be the eruption of hornblende bearing calc-alkalic ashflow containing subordinate Rhyolite lavas. This must have been possibly related to the Sleeping Butte Caldera that is exposed to the Northern Oasis Valley. This must have been about 1400 km³ of tuff that got deposited within the Oasis valley Caldera complex. The Crater Flat Tuff's Bullfrog member is seen to be the most extensive and extends into the Death Valley on the west side. The eruptive events have been estimated to have taken place around 16 to 14 million years back. A significant collapse seem to have occurred in the Silent Canyon Caldera around 13.8 million years ago coinciding with the eruption of Peralkaline Grouse Member part of the Belted Range Tuff. Following these eruptions the Silent Canyon Caldera is seen to be the source of Calc-alkalic rocks. The Vitrophyre Rhyolite The Rhyolite sheets are apparent with a spot of vitrophyre. There is a distinct difference in color and the glassy layers are clear and evident in the specimen. The black vitrophyre is also exhibited. both the components of the rock have their origin in the same magma and the difference is due to the rate of cooling.

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