The eastern part of the acid igneous complex at Barda Hills in western Saurashtra, Kathiawar Peninsula (Gujarat), consists of volcanic–subvolcanic rocks of epizonal nature which are in general grouped under the Deccan Trap series of late Mesozoic–early Tertiary age.

The entire complex has a roughly circular plan. Its eastern part, with which the present investigation is concerned, consists of a number of composite stocks. The stocks were emplaced in a nearly vertical manner by magmatic stoping mechanism, indicated by the presence of huge blocks of basalt enclosed in the acid bodies. Two cone sheets, one of rhyolite and another of dolerite have been mapped.

The acid igneous complex has intruded and extruded through the Deccan Trap basalt (which consists of flood basalts covering most of Kathiawar) forming central type foci of eruption. The acid rocks have thermally metamorphosed the basalt flows forming a contact metamorphic aureole of pyroxene hornfels to albite–epidote hornfels facies mineral assemblages.

The acid igneous complex is composed of coarse granophyre, fine granophyre, felsite and rhyolite, and also a minor microgranite and a pitchstone. A granodiorite porphyry forms later intrusive plugs within the granophyre and represents an intermediate rock type ($\text{SiO}_2 = 57.56$ percent). Late basic dykes of dolerite within the acid rocks indicate that basaltic magmatism was still active after the cessation of acid igneous activity.

The acid rocks from rhyolite, through felsite to coarse miarolitic granophyre have normative chemical compositions equivalent to the minimum
of the experimental 'Granite-Water' system. Chemically the rocks are meta-aluminous to slightly peralkaline in nature. They consist mainly of plagioclase, quartz and potash feldspar solid solution, with an average of 34.81 albite (+ anorthite) : 25.46 quartz : 23.36 potash feldspar (weight percent). Clinopyroxene is the main mafic phase, with rare fayalitic olivine. The iron-titanium oxide minerals are the main accessory minerals.

Clinopyroxene represents a gradual change in composition in the different types of the acidic rocks, from augite-ferroaugite-ferrosalite-hedenbergite-aegirine-augite - aegirine. The pyroxenes reflect a trend of iron-enrichment towards hedenbergite followed by a trend of enrichment in aegirine (Na Fe\textsuperscript{3+} Si\textsubscript{2} O\textsubscript{6}) molecule. A moderately low oxygen fugacity of $f_{O_2} = 10^{-13}$ atmosphere at an assumed temperature of 900°C explains the fayalitic olivine - magnetite-quartz assemblage. The appearance of aegirine molecule in pyroxene was caused by more oxidizing conditions in the later stages. This is reflected in the wide range in oxidation indices between 28 for ferroaugite granophyre and 78 for aegirine-augite granophyre.

A great variety of textures, namely granophyrlic, spherulitic, felsitic and miarolitic structure has been shown by these rocks. Minerals developed in the miarolitic cavities are quartz, alkali feldspar, albite, iron ores, fluorite, beryte, chlorite, stilpnomelane, calcite, sphene, zircon, aegirine-augite, aegirine and alkali amphibole.

No single mechanism can be deduced for the origin of the Barda Hills acid magma. A combination of processes involving partial melting of the lower crust forming rhyolite magma and differentiation of the Deccan Trap basalt magma with the formation of an acid fraction, might have both contributed to the generation of the Barda Hills acid magma.