

MINERALS IN MALAYSIA FOR THE CERAMIC INDUSTRY

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The ceramic industry which covers the manufacture of diversified types of products such as whitewares, refractories, structural clay products, glass, enamel, abrasives and abrasive products, technical ceramics, cement, lime and plaster and artwares, use a wide variety of naturally occurring raw materials and minerals. These minerals are of various categories and origin. Main minerals are china clays, quartz and feldspar which are extensively used in whiteware and artware bodies and glazes. Fire clays are used for making refractory firebricks. For high temperature use, high alumina refractories are made with use of high aluminous materials such as bauxite and diaspore. Anhydrous aluminosilicate materials such as kyanite, sillimanite, andalusite and pyrophyllite are also used to make refractories with alumina content of 50% and above as well as mullite refractories. Shales and slates and other redburning clays are used for manufacture of structural clay products such as building bricks, facing bricks, paving bricks, roofing tiles, paving tiles, drain pipes and terracotta wares.

Magnesium minerals such as talc and steatite are used for whiteware bodies of wall tiles and electrical insulators. Magnesite is used for making basic refractories which are extensively used by iron and steel industry. Lime bearing minerals limestone and dolomite are used for whiteware bodies and glazes in the form of marble, whiting and calcite. The limestone and dolomite are used for making basic refractories. Dolomite and limestone are the main constituent of glass batches.

Quartz and silica, relatively low in iron content, is used for glass as well as whiteware bodies and glazes. Feldspar and nepheline syenite, which are alkali bearing minerals, are extensively used as flux in whiteware bodies and glazes. Also borax, a boron mineral, is used as an active flux for the whiteware bodies and glazes.

Rutile, ilmenite, anatase which are titanium minerals and zircon and zirconia which are zircon minerals, are used as opacifiers in whiteware glazes. Zircon due to its high fusion point find use as refractories for glass melting tank blocks. Graphite, which also has a very high fusion point and inertness to molten metal, is used for making crucibles and carbon refractories used for iron and steel making. Fluor-spars are used as whitening agent in glass and enamel batches. Coal and mineral oils are the main fuels used by the ceramic industry.

The geology, mineralogy, the physical and chemical characteristics as well as occurrence in Malaysia for all these minerals used by ceramic industry, are discussed in detail in this paper.