

ALIEN PROPERTY CUSTODIAN

PROCESS FOR EXTRACTING POTASSIUM AND ALUMINIUM FROM MIXED POTASSIUM-ALUMINIUM SILICATES

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Property Custodian

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One of the methods proposed for extracting potassium and aluminium from leucites and similar minerals comprises dry-treating the mineral at temperatures from 1200° C to 1600° C in the presence of limestone or other calcium salts; the double silicate is then decomposed giving a mixture of insoluble calcium silicate and soluble potassium aluminate, which may be separated by lixiviation.

However, this process has a serious drawback owing to the fact that a considerable rate of potassium is lost by volatilisation during the heat treatment, so that rather low yields are obtained. Trials have been made with a view of recovering the potassium volatilised, and also of reducing the temperature necessary to decompose the double silicate (e.g. by subjecting the mineral to forced grinding); but these steps have not been successful. A certain advantage may be obtained by subjecting the mixture to thermal treatment in form of cakes previously prepared by dry-pressing, but even in this way the losses are still almost considerable.

I have now found that the volatilisation of K_2O depends at equal temperatures upon the

amount of burned gases circulating in the furnace in which the thermal treatment is carried out, as each temperature corresponds logically to a certain K_2O -vapour tension. Consequently, to reduce potash losses to a minimum, thermal treatment should be advantageously carried out in muffle furnaces, as in these furnaces heat treatment is indirect.

This method requires however considerable fuel consumption and encounters serious difficulties in design, in view of the high temperatures the material must reach.

I have therefore projected a tunnel furnace with heated wall space; in this way and keeping the space temperature equal to the internal temperature, the heat transmission outside is reduced to a minimum, so that the amount of hot combustion gases to be sent into the furnace is nearer to the theoretical amount and the least necessary.

When operating as outlined above it is possible to reduce considerably the losses in potassium and reach yields of the order of 90% and even more.

GIACOMO FAUSER.