STUDIES ON THE REACTION OF EPPAWELA APATITE WITH ALKALI HYDROXIDE AND QUARTZ

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The molar ratio of apatite, soda ash and quartz, 1 : 2 : 1, respectively, was found to be suitable(1,2) for the production of a fertilizer from Eppawela apatite. In the present study, the solid-state reaction of apatite with alkali hydroxides (NaOH and KOH) and quartz has been investigated in an attempt to replace soda ash by alkali hydroxide in the fertilizer composition.

Compositions having the molar ratios of apatite, alkali hydroxide and quartz ranging from 1 : 1 : 0 to 1 : 4 : 2 were heated at 950°C in a muffle furnace for 3 hours, and the available P_2O_5 contents of the products were estimated. The products were identified by power X-ray diffraction.

The molar ratios of 1 : 4 : 0 and 1 : 4 : 2 with NaOH gave the best yield of available P_2O_5. The 1 : 4 : 0 composition contained rhenanite ($CaNaPO_4$) and free lime while 1 : 4 : 2 composition contained only rhenanite as the major phase. pH of the water extracts of the products varies from 8.0 – 11.3 and high pH values are associated with the presence of free lime in the product.

The results of this study indicate that a molar ratio of apatite and soda, 1 (apatite) : 4 (Na_2O), is required for the complete break down of Eppawela apatite and the molar ratio of apatite, alkali hydroxide and quartz, 1 : 4 : 2, is most suited for the production of a fertilizer.

References

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