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Tobermorite from Castle Hill near Kilbirnie, Ayrshire

VUGS of a few inches across were seen in a basaltic volcanic plug, probably Carboniferous in age, that is part of Castle Hill, 2 miles west-south-west of Kilbirnie in Ayrshire. This is a known locality for pectolite and prehnite. The contents of one vug revealed a white-pink mass with small acicular crystals discernible. The hardness was 5.5, and the specific gravity 2.65. An X-ray powder photograph (Philips 11.46 cm) gave a reasonable indication of the 11 Å tobermorite, the identification later being confirmed by the Mineral Department of the British Museum (Natural History).

Tobermorite was first described by Heddle (1880) from Tobermory, Mull, has since been found on Skye and at Morvern, and is similar to synthetic calcium silicate hydrate in cement (Claringbull and Hey, 1952). Its structure has been determined by Megaw and Kelsey (1956), and by Mamedov and Belov (1958).

The water content of the sample was 13 % (TGA) using small flakes, as grinding lost water. The end product was white wollastonite, so iron was not suspected. Aluminium can be determined by the shift of infra-red absorption bands (Diamond *et al.*, 1966), but the relevant peak obtained was at the same wavelength (1207 cm⁻¹) as that given for unsubstituted tobermorite, so aluminium was not present. A flame test indicated calcium, and sodium was found present only in a very small amount by flame photometry. Analysis gave: CaO 37.4, SiO₂ 49.6, H₂O 13.0 %, in good agreement with the structural formula of Mamedov and Belov, Ca₁₀Si₁₂O₃₁(OH)₆·8H₂O.

This is a new locality for tobermorite, and unusual, as previous samples have been found in Tertiary volcanics. There is some controversy as to the age of these plugs in Ayrshire, and radiometric dating is planned for the near future on rocks from this area by the Institute of Geological Sciences..

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