Dielectric properties of hydroxyapatites—a reply

It is, of course, true that Kay, Young, and Posner (1964) showed that the hydroxyl ion is *not* exactly centred in the plane of the calcium ions, and we regret this error. However, our intention was really to contrast the known good properties (low dielectric loss) of the hydroxylapatites where the hydroxyl ion occupies the (2a) site, albeit slightly displaced, with the possibly less favourable situation found in chlorapatites and pyromorphites where halogens (other than F) occupy the (2b) site. By assuming that the Ca ions lie on the *a* plane (i.e. a *y* co-ordinate of 1·000 instead of 0·993) simple calculation using the usual ionic radii shows that the hydroxyl ions must occupy similar situations in both $Ca_{10}(PO_4)_6.(OH)_2$ and $Ca_4La_6(SiO_4)_6(OH)_2$.

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Lead apatite solid-solution series

Recent studies on the crystal chemistry of the apatites (Cockbain, 1968) have shown that apatites with the general formula $A_{10}(XO_4)_6.Z_2$, including the lead apatites or pyromorphites, may be classified into three groups on the basis of the ratio of the size of the A ion to the X ion. Vanadinite has a ratio of 2·21 and belongs to the first group, mimetite has a ratio of 2·82 and belongs to the second group, while pyromorphite itself has a ratio of 3·76 and falls in the third group.

Continuous solid-solution series between these three minerals have frequently been postulated, and experimental studies such as those of Baker (1966) tend to support this view. However, calculations have shown that the discontinuities postulated by Cockbain (1968) cover only restricted composition ranges, and it was thought desirable to re-examine some of the mineral members of the series for evidence of these discontinuities.

A selection of pyromorphite crystals from Roughtengill, Caldbeck Fells, Cumberland (Grid Ref. NY302346) was collected by the author and these comprised the typical 'barrel'-shaped yellow-green or brownish-green crystals, together with some that had an epitaxial