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On the interpretation of the Mössbauer spectra of biotites

B. A. GOODMAN

The Macaulay Institute for Soil Research, Craigiebuckler, Aberdeen AB9 2QJ, Scotland

In a recent publication Bancroft and Brown (1975) have referred to a disagreement between Goodman and Wilson (1973) and Annersten (1974) in the interpretation of the Mössbauer spectra of biotites. In fact, the papers agree in their assignments, the apparent discrepancy being due only to a different choice of nomenclature. Goodman and Wilson defined the types of octahedral site in biotite as "one designated $M1$ where the hydroxyl groups are arranged adjacent to one another (*cis*), and one designated $M2$ in which the hydroxyl groups are opposite (*trans*). In one formula unit . . . there are four $M1$ and two $M2$ sites." Annersten distinguished the two types of octahedral sites in the following way. "One of the site types $M1$, which has apical hydroxyl ions, has the symmetry $2/m$ whereas the other position $M2$, where the hydroxyl ions occupy one shared edge of the octahedron, has the symmetry 2. In the mica unit cell there are twice as many $M2$ sites as $M1$ sites."

It is obvious, therefore, from these definitions that the site labelled $M1$ by Goodman and Wilson is unfortunately the same as that labelled $M2$ by Annersten and *vice versa*. When the results are referred to the biotite structure, there is no disagreement between these groups of authors on the assignments of the Mössbauer spectra and it was in fact concluded in both publications that there is little if any ordering of iron in the biotite structure, the conclusion also arrived at by Bancroft and Brown for several of their samples.

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