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# Aluminum Interlayers in Layer Silicates Effect of OH/Al Ratio of Al Solution, Time of Reaction, and Type of Structure

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**Abstract:** Aluminum interlayers were synthesized under the same experimental conditions in a number of vermiculites and montmorillonites from different sources to determine the effects of the degree of neutralization of Al solutions, the time of reaction, and the type of structure.

Vermiculite fixed Al as well as hydroxy-Al ions in its interlayers, producing a stable 14 Å spacing and decreasing its cation exchange capacity considerably. Heating the Al-interlayered vermiculite at 300° C produced an interstratified mixture, indicating that some interlayers collapsed while others did not. The different collapse was attributed to different charge on vermiculite layers.

Neither the aging of vermiculite in Al solutions nor their OH/Al ratios changed the stability of the interlayers appreciably.

Montmorillonites, on the other hand, did not fix Al ions but fixed appreciable amounts of hydroxy-Al ions. In addition, the stability of the interlayers in montmorillonite increased on aging in hydroxy-Al solutions and exceeded the stability of the interlayers produced in vermiculite. To explain the greater stability of montmorillonite interlayers, it was postulated that the more expanded interlayer space in montmorillonite provides a favorable locale for the organization of hydroxy-Al ions into gibbsite structure while the restricted expansion in vermiculite prevents it.

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