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# Synthesis and Swelling Properties of Saponites with Increasing Layer Charge

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**Abstract:** Nine synthetic Na-saponites with charge densities varying between 0.33 and 1.0 have been prepared. Their swelling properties and structural organization in water, ethylene glycol and glycerol show discontinuities in the physico-chemical behaviour of these samples. The layer charge densities caused changes in swelling properties and structural organization of the minerals. These changes also depended upon the nature of the solvation liquid and the interlayer cation involved.

Electron diffraction patterns of the Ba-saponites showed no abnormal diffusion making honeycomb-like patterns between Bragg reflections.

The results indicate criteria for estimating the layer charge of tetrahedrally substituted trioctahedral 2/1 phyllosilicates.

There is no upper limit until  $x = 1$  for the layer charge  $x$  which is specific to the smectite-group. Consequently, the changes in the swelling properties observed when  $x = 0.5-0.6$  and  $x = 0.8-0.9$  come from the modifications of the interlayer structure, which are mainly a function of cation-liquid and silicate layer—liquid interactions. Consequently, there is an overlap between the saponite and the vermiculite mineral groups.

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