Reaction of Hydroxy-Bismuth Polycations with Montmorillonite

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Abstract: Interlayer sodium ions of montmorillonite were exchanged with hydroxy-bismuth polycations which were prepared from bismuth perchlorate solutions by the addition of NaOH. Assuming the charge density of the silicate layer to be unchanged, the compositions of the polycations involved in the exchange can be estimated from the amount of bismuth taken up by the montmorillonite and from the ignition loss between 110 ° and 800 ° C. The derived compositions are near $[Bi_6(OH)_{16}]^{2+}$ irrespective of the ratio of OH:Bi in the perchlorate solution. The basal spacing of the hydroxy-bismuth montmorillonites is about 16 Å at 110 ° C, which corresponds to that of hydroxy-chromium montmorillonite having a high surface area of about 250 m^2/g. The surface areas of the hydroxy-bismuth montmorillonites, however, are less than 80 m^2/g.

Key Words: Bismuth • Cation exchange • Hydrolysis • Hydroxy-bismuth • Montmorillonite • Surface area

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