
Kaolinization of Bauxite: A Study of the Vlasenica Bauxite Area, Yugoslavia. II. Alteration of Oolites

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Abstract: During the epigenetic alteration of boehmitic karstic bauxite in the Vlasenica region of Yugoslavia, which was caused by siliceous water descending through the deposit by means of cracks, fissures, etc., oolites were less altered compared with the coexisting matrix material, which was intensely kaolinized. The following zonal alteration pattern of the oolites was identified: a diaspore enrichment zone, followed by a diaspore-boehmite enrichment zone, and then the original bauxite. Considering this alteration pattern and that determined previously for the matrix material, the following overall pattern of alteration was established: a kaolinite-diaspore zone, followed by a boehmite-diaspore zone, and then the original bauxite. The alteration solutions reacted with the bauxite to form solution-matrix and solution-oolite subsystems, which were characterized by different types of diffusion and geochemistry.

In the kaolinite-diaspore zone Si-metasomatism kaolinized the matrix, and excess Al partly migrated into the oolites, forming diaspore, and outward into the bauxite. The latter Al-remobilization resulted in a transition zone, in which new boehmite was formed in both the matrix and the oolites, and diaspore only in the oolites. Thermodynamic models of oolites and whole bauxite alterations were established, on the basis of stability diagrams calculated for the mineral assemblages of both the oolites and the matrix, in the alteration zones and in the deposit as a whole. Based on these models, the genesis of the diaspore and the relationship of diaspore-boehmite-kaolinite assemblages in natural systems at low temperature and low pressure can be described.

Key Words: Aluminum • Bauxite • Boehmite • Diaspore • Kaolinization • Oolites

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