
Quantitative Phase Analysis of Bidi-Koum Bauxites (Guinea)

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Abstract: Fifty-two Bidi-Koum bauxites from Guinea, Africa, of diversified chemical composition were characterized for their mineral composition. First, 14 element oxide concentrations were determined by X-ray fluorescence (XRF) using a fusion sample preparation technique. Loss of Mass (LOM) and organic carbon (OC) concentrations were also determined. The initial X-ray diffraction (XRD) phase quantification was carried out employing XDB software. This software allows for full interpretation of a sample diffractogram and helps generate initial concentrations of identified minerals based on a standardless approach. In the stage that followed, the mass balance procedure on the XDB software helped refine the final phase composition. Then, gibbsitic Al₂O₃ concentrations obtained by wet chemistry for all samples and kaolinitic SiO₂ concentrations obtained for selected samples were compared with the concentrations obtained using the XDB software. Phases that were quantified are: gibbsite, boehmite, kaolinite, wavellite, goethite, hematite, quartz, anatase, rutile and illite. Phase concentrations were obtained for illite from K₂O and for wavellite from P₂O₅ concentrations. The alumina substitution in the goethite lattice was also estimated.

Key Words: Bauxite • Boehmite • Gibbsite • Goethite • Hematite • Quantitative Phase Analysis • Wet Chemistry • X-ray Diffraction • X-ray Fluorescence

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