
Determination of Noncrystalline Soil Components by Weight Difference after Selective Dissolution

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¹ The term noncrystalline as used in this paper follows the recommendation of Wada (1977) in describing materials having only local and nonrepetitive structure and includes paracrystalline materials (having one-dimensional structural units) such as imogolite.

Abstract: A procedure based on loss of weight after selective dissolution analysis (SDA) and washing with $(\text{NH}_4)_2\text{CO}_3$ was developed for estimating the noncrystalline material content of soils derived from widely different parent materials. After extracting with 0.2 N ammonium-oxalate or boiling 0.5 N NaOH solutions, samples were washed with 1 N $(\text{NH}_4)_2\text{CO}_3$ to remove excess dissolution agents and to prevent sample dispersion. The amount of noncrystalline material removed from the sample by the extracting solution was estimated by weighing the leached products dried to constant weight at 110° C. The results match closely with those obtained by chemical analyses of the dissolution product and assignment of the appropriate water. The proposed weight-loss method is less time-consuming than the chemical method, and no assumptions need be made concerning sample homogeneity or water content of the noncrystalline material.

Extractions of whole soil and dispersed clay fractions indicated that noncrystalline material determinations on the clay fractions underestimated the noncrystalline material content for whole soils from 0 to 34%. Acid ammonium oxalate was found to be a much more selective extractant for noncrystalline materials than NaOH.

Key Words: Allophane • Noncrystalline • Quantification • Selective dissolution • Soil • Weight loss

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