
Chemistry of Detrital Biotites and their Phyllosilicate Intergrowths in Sandstones

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Abstract: Microprobe analyses of optically homogeneous detrital biotites from sandstones of the Visingsö Group and the Dala Sandstone, Sweden, revealed a consistently low K content (generally <0.75 atom/formula unit) and variable amounts of Fe, Mg, Al, and Si. Electron probe profiles of some biotite grains indicated two major types of interstratification, one consisting of mainly illite layers and the other apparently consisting of chlorite layers. The layer thicknesses commonly ranged between 0.5 and 3 μm . Microprobe analyses of some thick ($\sim 5 \mu\text{m}$) illitic layers indicated a phengitic composition, wherein the mica was relatively rich in octahedral Fe and Mg. The chloritic layers appeared to be Fe-Mg-rich and generally had octahedral totals of <6 atom/formula unit. Variations in the chemical composition of the biotite and some of the illite and chlorite were probably due to an uneven distribution of small amounts of the interstratified phases. The illite and chlorite layers were apparently formed by pseudomorphic replacement of detrital biotites, i.e., gradual replacement of one biotite layer by one layer(s) of illite and/or chlorite during diagenesis.

Key Words: Biotite • Chemical analysis • Chlorite • Diagenesis • Electron probe • Illite • Intergrowth

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