
The Composition and Origin of Vanadium-Rich Clay Minerals in Colorado Plateau Jurassic Sandstones

J. D. Meunier*

GS CNRS-CREGU, CREGU, BP23, 54501 Vandoeuvre les Nancy, France

* Present address: Laboratoire de Geoscience de l'Environnement, URA CNRS 132 Case 431, Université d'Aix-Marseille III, 13397 Marseille Cedex 20, France.

Abstract: The composition and origin of vanadium-bearing clay minerals in the Jurassic (Morrison and Entrada Formations) sandstones of the Colorado Plateau are reassessed using microanalyses (microprobe and scanning electron microscope). The main V-clays are authigenic illite and chlorite of various petrologic habits: clay casts and matrix, pore lining, replacement of detrital grains. The chemical composition of the V-clays is similar in three different localities in the Morrison Formation separated by about 50 km, suggesting that the V-clays are the result of a large regional event. In both illite and chlorite, Al and V are inversely correlated, showing that V replaces Al in the octahedral position. The chlorite contains a complex mixture of divalent and trivalent cations that cannot fit within a sudoite structure. A classification of V-micas is proposed that employs $V^{3+}/\text{sum of the octahedral cations vs. the sum of the interlayer charges}$. V-illite and roscoelite from the Colorado Plateau are characteristic of diagenetic/hydrothermal environments. For a given locality the composition of the V-clays does not vary with habit, showing that these minerals formed at thermodynamic equilibrium.

Key Words: Chlorite • Diagenesis • Illite • Microprobe • Roseoelite • Sandstone • SEM • Vanadium

Clays and Clay Minerals; August 1994 v. 42; no. 4; p. 391-401; DOI: [10.1346/CCMN.1994.0420403](https://doi.org/10.1346/CCMN.1994.0420403)

© 1994, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
