
Ammonium Substitution in Illite During Maturation of Organic Matter

Lynda B. Williams and Ray E. Ferrell Jr.

Basin Research Institute and Department of Geology and Geophysics Louisiana State University, Baton Rouge, Louisiana 70803-4101

Abstract: Pierre shale samples from a thin stratigraphic zone within the contact aureole of the lamprophyric Walsen dike record changes due to thermal effects that are not influenced by detrital differences. Analyses of fixed-NH₄, mineralogy, and Rock-Eval pyrolysis indicators of organic matter maturity provide new insights on the fixation process. Fixed-NH₄ increases with the quantity of authigenic illite formed from illite/smectite, but the maximum fixation per unit of illite formed occurs within the "oil window" where thermal breakdown of organic matter is rapid. Extrapolation of these results to the burial diagenetic regime supports the potential use of fixed-NH₄ as an indicator of organic maturity and hydrocarbon migration pathways.

Key Words: Ammonium substitution • Fixed-ammonium • Hydrocarbon generation • Illite/smectite transformation • Organic maturation

Clays and Clay Minerals; August 1991 v. 39; no. 4; p. 400-408; DOI: [10.1346/CCMN.1991.0390409](https://doi.org/10.1346/CCMN.1991.0390409)

© 1991, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
