

Implications of Organic Matter Source and Fluid Migration from Geochemical Characteristics of Stylolites and Matrix in Carbonate Rocks: A Case Study from the Carboniferous and the Ordovician in the Sichuan Basin, Southwest China

Shiju Liu, Wenzhe Gang, Gang Gao
CHINA UNIVERSITY OF PETROLEUM (BEIJING)

9.29.2020 - 10.1.2020 - AAPG Annual Convention and Exhibition 2020, Online/Virtual

Abstract

In order to study the organic matter source in stylolite and its effect on hydrocarbon migration, carbonate rock core samples containing stylolites in the eastern Sichuan Basin were collected. The stylolite and matrix in the cores were analyzed by TOC, Rock-Eval pyrolysis and GC-MS for the saturated fractions. The organic matter is more enriched in the stylolite than the matrix, and the stylolite have higher hydrocarbon expulsion efficiency than the matrix, which can be used as a supplement to the later generation of the source rock. The hydrocarbons formed by the matrix aggregated near the stylolites and cause the Hydrocarbon Index of the matrix which adjacent to the stylolites to become higher, this indicates that the stylolite is an important channel for hydrocarbon discharge of carbonate rocks. The ratios of close molecular biomarker in stylolite indicate that the deposition environment, biological origin and maturity of organic matter in the stylolites are consistent with the matrix, therefore, the organic matter in the stylolite should be inherited from the matrix, but the light to heavy molecular biomarker ratios of the stylolite indicate that component fractionation occurred when the hydrocarbons generated in the matrix migrated to the stylolite. Especially, a series of light to heavy molecule ratios of C19 to C23 tricyclic terpanes and C14 to C19 normal alkane of stylolite are lower than that of matrix, this indicates

that the hydrocarbon fractionation in the course of hydrocarbon migration along the stylolite is more obvious than that in the matrix.

AAPG Datapages/Search and Discovery Article # 91200 © 2020 AAPG Annual Convention & Exhibition Online, Sept. 29- Oct. 1.