

# **Geochemical characteristics of organic matter in shale of Lower Cambrian Qiongzhusi Formation in Sichuan Basin**

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The shale of the Qiongzhusi Formation developed in the Cambrian worldwide is an important set of high-quality source rocks except Wufeng-Longmaxi Formation. This set of source rocks is widely distributed, but its thickness and quality vary greatly in different areas. It is of great significance to reconstruct its organic matter enrichment mechanism to predict the distribution of high-quality source rocks and provide guidance for shale gas exploration. Based on X-ray diffraction, total organic carbon content and element geochemical characteristics of shale samples from drilling cores in Weiyuan area, Sichuan Basin, the control effects of paleoclimate, paleoproductivity and paleo-ocean on the formation of shale in the Qiongzhusi Formation were discussed, and the development mechanism of organic matter in the shale of the Qiongzhusi Formation in the Lower Cambrian was revealed, as well as the coupling relationship between biological activities, marine environmental changes and organic matter enrichment. The results show that the high-quality shale of the Qiongzhusi Formation is thick (more than 200m) and has a relatively high organic carbon content, and the TOC is between 0.5% and 5%. The ratios of V/Cr, U/Th and iron composition indicate that the shale of the Qiongzhusi Formation has undergone the change of anoxic sulfide-anoxic iron-secondary oxidation-oxidation environment from bottom to top, and the Mo isotope pairs. Based on the study of paleoproductivity, hydrothermal activity and weathering degree, the main controlling factors of four stages of shale in Qiongzhusi Formation are obtained: the first stage is mainly controlled by hydrothermal fluid activity; The second and third stages are mainly controlled by redox conditions; The fourth stage is mainly controlled by productivity.