

## **The petrological and geochemical characteristics of K-bentonites in Ordovician-Silurian stage and their geological significances**

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Volcanic ash could release nutrient into seawater to promote plankton bloom and improve paleoproductivity, reducing dissolved O<sub>2</sub> in seawater and promote organic matter preservation. In order to investigate the role of volcanic ash in organic matter accumulation and preservation in ancient strata, the petrological and geochemical characteristics of the Late Ordovician to Early Silurian Wufeng and Longmaxi Formations organic-rich shale in Sichuan Basin, South China are studied, which contain lots of volcanic ash layers. Based on the combined analyses of thin sections, X-ray diffraction, SEM, XRF, and REE test, indicated that: (1) The K-bentonites are composed of clay minerals and non-clay minerals. Clay minerals are dominated by illite/smectite mixed layers and illite. Non-clay minerals include quartz, gypsum, albite, pyrite, calcite, anatase and ankerite. The contents of clay minerals, quartz, albite and pyrite are 78.1-91.26%, 2.55% - 7.68%, 5.05-8.73%, 0-8.96% respectively. For clay minerals, the contents of I/S mixed layers and illite are 65-100% and 15-35%. (2) The CI chondrite-normalized REE distribution patterns of K-bentonite samples include right-inclined and left-inclined two types. All the samples have Eu negative anomaly. (3) K-bentonites derive from intermidate-acidic magma. The tectonic settings of the formation of primary rock include volcanic arc setting, syn-collision setting and within-plate setting. (4) For Guanyinqiao section and 2 wells, the TOC contents of shales containing K-bentonite layers (within 10cm above and below bentonite layers) and normal shales (10cm away from bentonite layers) range from 0.29-5.51% (average: 1.95%), and 0.36-7.87% (average: 2.04%) respectively. Our data suggests that volcanic ash does not have obvious influence on organic matter accumulation and preservation.