

## **Chlorite authigenesis and its impact on reservoir quality in the Triassic Yanchang Formation tight sandstone reservoirs, southwestern Ordos Basin**

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### Abstract:

As a major diagenetic factor controlling reservoirs quality and heterogeneity, authigenic chlorites are widely distributed in the Triassic Yanchang Formation tight sandstone reservoirs of the southwestern Ordos Basin, China. The occurrence and origins of authigenic chlorites were studied using an integrated approach of optical microscopy, scanning electron microscopy, x-ray diffraction, electron microscopy. Two generations of authigenic chlorites, occurring as pore-lining and pore-filling, were observed in tight sandstones. Pore-lining chlorites occur as clay coatings on framework grains and distribute in the whole fining-upward sandstone units. Pore-filling chlorites, only developed in the middle to upper part of fining-upward sandstone unit, however appear as rosettes or bobbles in the pore or attached to the surfaces of pore-lining chlorites. Pore-lining chlorites were originated from smectite precursors that are derived from volcanic materials alteration at the early stage of diagenesis with temperatures mainly below 90°C. Pore-filling chlorites however were precipitated in pore spaces with higher concentration of Mg<sup>2+</sup> and Fe<sup>2+</sup> released from volcanic rock fragments and mica debris dissolution. Moreover, the chemical composition of pore-filling chlorite was disturbed by earlier calcite cementation at temperatures lower than about 110°C. Only thick and continuous pore-lining chlorites have a positive effect on reservoirs porosities, while thick pore-lining chlorites or pore-filling chlorite reduced the porosity and permeability seriously.

### Key words:

Authigenic chlorite; Reservoir quality; Tight sandstones; Yanchang Formation; Ordos Basin