## The discovery and geological significance of Yanchang formation in South-Eastern Ordos basin

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Yanchang formation was a main oil bearing series in Ordos basin of China. It was the superimposed and connection sand body was the major hydrocarbon migration pathway.However the pathways septated by thick muddy barrier or low permeability reservoir far away from source rock can not be explained. In this reason, partical researchers put forward that cracks were also the main hydrocarbon migration pathways, however lacking of direct evidence.

It developed vertical fractures at Yanchang formation of Ying16 well. By observing the calcite vein samples under microscope, found it contained plenty of boiling hydrocarbon inclusions, including inorganic salt water, liquid and gas phase hydrocarbon inclusion which existed in hydrocarbon inclusion combinations, whose filling degree were different, the liquidphase as the major and gas-liquid ratio from 1.6 % to 3%, the size mostly from 8 to 12µm, shape consistent with motion state, regularly arrangement, as they were all boiling unstopped. During heating test, the homogenization temperature was Fahrenheit 90, salt degree from 1 0.2%to 1 8.45 %. By Using laser Raman spectroscopy, gas phase was without  $H_2O$ , and the content of total hydrocarbons ( $\Sigma Ci$ ) was 23.5%, methane content 6.7% occupied 30.2% in total hydrocarbons; Liquid phase contained H<sub>2</sub>O 63.7%, and the content of total hydrocarbons ( $\Sigma$ Ci) was 32.7%, methane content 13.6% occupied 41.6% in total hydrocarbons.

According to the basin thermal evolution analysis, oil and gas formed boiling hydrocarbon inclusion because of structural cracks development which connected the upper atmosphere pressure reservoir and lower high-pressure source rock, it charged as burst-mode along cracks, boiling in the lower high-pressure space, captured by calcite veins.

Boiling hydrocarbon inclusion provided evidence for oil and gas migration along cracks, and combined with the discover of crack high well in oil production plant, we thought that oil and gas migrated along crack in partical areas where it would discover high production crack well or form closed cracks reservoir.

## Transcriptional analysis of the response to supersaturated silicic acid in *Thermus thermophilus*

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The genus Thermus are defined as aerobic, heterotrophic, non-motile, pigmented, non-spore-forming, and Gramnegative rods that can grow at temperatures over 70 °C. Previously, we isolated Thermus thermuohilus TMY from the geothermal power plant in Japan [1] and reported that strain TMY induces the precipitation of supersaturated silicic acid during exponential growth phase [2]. Notably, supersaturated silicic acid markedly stimulated expression of one cell envelope protein, which is named as silica-induced protein (Sip). The amino acid sequence of Sip showed significant similarity with the solute-binding protein of Fe<sup>3+</sup> ABC transporters observed in other Thermus strains [3], however, little is known about the regulation of gene expression in response to supersaturated silicic acid. To determine the regulation of Sip expression, the transdriptional regulation mechanisms were investigated.

Althogh sip operon comprises sip (solute-binding protein), permiase and ATPase, only sip gene was strongly transcribed in the silica-stressed condition. This might result from the fact that the palindromic structure located immidiately downstream of sip could function as the terminator of sip. Primer extension analysis revealed that transcription initiation site of sip is located at 34 bases upstream of start codon. -35 and -10 element of the sip promoter showed meaningful similarity to those of  $\sigma^A$  promoters commonly seen in *T. thermophilus*. Sip trnscription was enhanced by the addition of supersaturated silicic acid, however, sip was also transcribed in the irondeficient condition. Due to the negative charge of colloidal silica in silica-stressed condition, iron ions might be trapped by colloidal silica. Thermus cells might receive the signals of the existence of supersaturated silicic acid as the iron deficiency caused by colloidal silica. This mechanism of silica-responsible promoter could serve us more convenient and effective genetic tools for thermophile and must shed new light on bacterial biosilicification studies.

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