Contribution ID: **650** Type: **Poster Presentation**

Research and evaluation of damage mechanism of pore scale water phase trap in tight sandstone gas reservoir based on numerical simulation

Wednesday, 15 May 2024 09:25 (1h 30m)

Background, Aims and Scope.
Tight gas resources are abundant and widely distributed, which is an important part of unconventional gas exploration and development. However, the tight sandstone reservoir has the characteristics of low porosity and permeability and micro-fracture development, so the water phase trap damage is more serious in the process of reservoir reconstruction. In addition, it is difficult to evaluate the damage of water phase trap in tight sandstone gas reservoirs at pore scale, and it is impossible to make a more accurate judgment of flowback and production pressure difference, which restricts the development of tight gas. Therefore, this study has practical guiding significance for the efficient development of tight sandstone gas reservoirs.
Methods.
Through core NMR experiments and finite element numerical simulation, the spatial and temporal distribution of water saturation and pressure in the pore throat of the gas-water phase in the process of forced imbibition and flowback is verified. The water phase trap damage degree of tight sandstone gas reservoirs at micro scale is evaluated by treating the part of the flowback model higher than the specific water saturation as the matrix.
Results and Discussion.
(1) In the process of forced imbibition, the high pressure area mainly concentrated in the blind end and narrow throat; The liquid phase flows rapidly through the dominant channel, and after a period of time, the distribution of pressure and water saturation in the whole system tends to be stable. (2) After flowback, a large number of isolated bubbles appeared in the capillary channel, which increased the frequency and severity of the occurrence of Jamin effect, resulting in a large amount of fracturing fluid remaining in the pore throat; (3) The calculated results of the model are basically consistent with those of core NMR. (4) The permeability of the two models before and after imbibition reflux was calculated respectively. The permeability of the model after imbibition reflux was significantly lower than that of the model before imbibition.

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

Country

China

Porous Media & Biology Focused Abstracts

References

Conference Proceedings

I am interested in having my paper published in the proceedings.

Primary authors: CHEN, Mingjun (西南石油大学); TANG, Xingyu (西南石油大学); KANG, Yili

Presenter: TANG, Xingyu (西南石油大学)

Session Classification: Poster

Track Classification: (MS03) Flow, transport and mechanics in fractured porous media