Contribution ID: **559**

Type: **Oral Presentation**

A new model for predicting conductivity under nonlinear fracture closure and proppant crushing grading curve evolution

Monday, 13 May 2024 17:30 (15 minutes)

To solve the problem of rapid decline in conductivity of sand filled fractures in deep shale, based on the mechanical process of compression and deformation of proppant pile, the constitutive equation of deformation and fracture of proppant pile was established, and the transfer matrix of gradation curve after fracture of proppant pile was established based on fractal theory. Combined with KC equation, the equivalent particle size and permeability evolution equation of sand pile under multi-particle fracture were deduced. Finally, a new model for predicting the conductivity of proppant embedment deformation and fracture is obtained. The new model is compared with the results of fracture width deformation experiment, sand pile permeability experiment and multi-particle size combination conductivity experiment, which proves the correctness of the model. The results show that the change of net closing pressure will change the fracture width and permeability, and thus change the fracture conductivity. The dominant factor of the change of conductivity is the net closing pressure, and the greater the net closing pressure, the smaller the conductivity. The main factor affecting the change rate of fracture width is the apparent elastic modulus of proppant pile. The larger the apparent elastic modulus is, the larger the fracture width is. The main factor affecting the change rate of fracture permeability is the fracture degree of proppant pile. The larger the fracture degree is, the smaller the permeability is. The larger the combination ratio of large particle size, the higher the conductivity. Therefore, the development of proppants with high apparent elastic modulus and low degree of breakage is of great importance to improve the conductivity. At the same time, this model also improves the theoretical guidance for proppant particle size combination selection, which is helpful to the optimization design of field construction.

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

I would like to submit this presentation into both awards

Country

CHINA

Porous Media & Biology Focused Abstracts

This abstract is related to Porous Media & Biology

References

Conference Proceedings

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

Primary author: WU, liansong (西南石油大学)

Co-authors: GUO, jianchun; HE, simin; WU, yutong; LIU, yuxuan

Presenter: WU, liansong (西南石油大学)

Session Classification: MS03

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