Contribution ID: **77** Type: **Oral Presentation**

Pore structure evolution of low-permeability sandstone under acid treatment: a Micro-CT investigation

Tuesday, 14 May 2024 12:00 (15 minutes)

The use of acid for permeability enhancement has gained popularity in mining and oil industries to enhance the recovery rate of low-permeability formations. This study employed static acid permeability enhancement tests, flooding acid permeability enhancement tests, and micro-CT scanning to investigate the mechanism of permeability enhancement and changes in pore structure during acid treatment. The extent of reaction between low-permeability sandstone samples and four different acids was evaluated by static tests, with hydrochloric and formic acids demonstrating good performance in dissolving filling minerals. Acid flooding experiments were conducted under reservoir conditions with a constant flow rate, and decreases in pressure difference between flow inlet and outlet were observed for most experiments, indicating an increase in permeability. The pressure difference was lower for hydrochloric acid compared to formic acid at the end of flooding, with permeability increases of 283% and 120%, respectively. Micro-CT scanning before and after acid permeability enhancement tests revealed changes in pores, pore throats, and coordination numbers using Avizo software. Based on micro-CT results, acid treatment led to an increase in the number of interconnected pores, pore throats, and their equivalent radii, resulting in higher permeability. The improved permeability was primarily due to the dissolution of dolomite, as identified by SEM-EDS and ICP.

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

Country

China

Porous Media & Biology Focused Abstracts

References

Primary authors: Mr LIU, Sinan (Institute of Rock and Soil Mechanics, Chinese Academy of Sciences); Prof. ZHANG, Liwei (Institute of Rock and Soil Mechanics, Chinese Academy of Sciences); Ms WANG, Yan; GAN, Manguang

Presenter: Prof. ZHANG, Liwei (Institute of Rock and Soil Mechanics, Chinese Academy of Sciences)

Session Classification: MS10

Track Classification: (MS10) Advances in imaging porous media: techniques, software and case studies