Contribution ID: **114** Type: **Poster (+) Presentation**

Flow rate and dissolution rate Impacts on the wormhole formation

Monday, 31 May 2021 19:35 (1 hour)

The dissolution of fractures exhibits various patterns when a reactive fluid was injected into undergrounds. We performed a visual dissolution experiment on NaCl crystals to simulate the coupling of reaction and dissolution in natural environments. Three typical dissolution patterns including face dissolution, wormholes and uniform dissolution were observed. However, the theoretical foundation of transitions of dissolution patterns remains unclear. Here, we proposed a theoretical model to illustrate the transitions of dissolution patterns affected by flow rate and reaction rate. By comparing the length for unsaturated fluids saturates at the radial and transverse direction, the phase diagram predicted by the model shows that wormhole dissolution will dominates when. The phase diagram not only exhibits good agreement with our this and previous experiments, but also is highly consistent with experiments and simulations of existing works. This work extends the classic phase diagram for fracture dissolutions and provide improved insights for dissolving process in subsurface applications.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

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Student Poster Award

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Track Classification: (MS8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media