Contribution ID: **275** Type: **Oral Presentation**

Using In-situ Wettability Measurements to Reconstruct the Wetting Conditions of a Natural Rock

Monday, 30 May 2022 16:20 (15 minutes)

This study is to infer the wetting status of a realistic rock based on measured contact angles (CAs) in a Bentheimer sandstone after one drainage-imbibition cycle in a scCO2 flooding experiment. Much research indicated that the wettability of natural rocks was heterogeneous. The heterogeneous wettability of natural rocks was usually assumed to be either mixed wettability or fractional wettability. In this study, a new fractional wettability model with wide-spectrum wettability will be proposed to represent the wetting status of a natural rock which assumes the wettability of rock surface is continuously distributed and covers a much larger range of wettability, measured as CA, in this study. Based on the measured CAs, a Kriging method will be used to reconstruct the wetting status of the Bentheimer sandstone used in the scCO2 flooding experiment. To evaluate the reliability of the reconstructed wetting status, a hybrid CPU/GPU parallel computing accelerated LBM algorithm will be used to simulate the scCO2flooding process. The distribution of brine and scCO2 will be compared. The flooding curve, relative permeability curve and capillary pressure curve of the rock sample with reconstructed wetting status will also be investigated. This new wettability model is expected to be closer to the actual wetting conditions of a given rock sample.

Acceptance of the Terms & Conditions

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References

Guo, R. C., Dalton, L. E., Fan, M., McClure, J., Zeng, L., Crandall, D., & Chen, C. (2020). The role of the spatial heterogeneity and correlation
length of surface wettability on two-phase flow in a CO2-water-rock system. Advances in Water Resources, 146, 103763.

Time Block Preference

Time Block C (18:00-21:00 CET)

Participation

Online

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