



Contribution ID: 34

Type: Oral Presentation

## Flow behavior in a rough channel with pore scale simulation

*Thursday, 3 June 2021 10:15 (15 minutes)*

**Abstract:** Pore scale immiscible displacement is crucial in oil industry. The surface roughness of throat is an important factor affecting water-oil interface movement. In this paper, the Navier-Stokes (N-S) equation coupled with the phase field method is adopted to analyze the oil-water flow and interface movement in single channel, considering different surface roughness, diverse wettability and various capillary numbers. The simulation results show that the existence of asperities strengthens the interface deformation and promotes the formation of fingering phenomenon. The water-flooding process presents different flow patterns in the rough channel with diverse wettability, and the influence of wall roughness on oil-water interface movement is different under various wettability conditions. There is an approximate exponential relationship between the ratio of interface length to channel length and capillary number. Moreover, the influence of wall roughness on wettability can not be ignored. The threshold Ca number of the wall from water wet to oil wet was studied at diverse roughness heights and distributions, and different viscosity ratios were considered.

### Time Block Preference

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

### References

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**Track Classification:** (MS9) Pore-scale modelling