Contribution ID: **8** Type: **Oral Presentation**

Investigating Cohesion Influence on Fine Particle Transport via Pore Doublet Model A CFD-DEM Analysis

Tuesday, 24 September 2024 10:00 (15 minutes)

This research delves into the transportation of micro-sized particles within a doublet pore model featuring two distinct pore throat sizes. To simulate a two-phase particle-fluid suspension, the CFD-DEM method is employed, combining the Navier-Stokes equation with Newton's second law of particle motion. Cohesion forces between particles and pore throats are characterized using the Simplified Johnson-Kendall-Roberts (SJKR) contact model, which is applied in our simulation to identify locations of agglomerations. Results reveal that altering cohesive energy density, from 10,000 J/m^3 to 100,000 J/m^3 , significantly increases the likelihood of agglomeration in the smaller pore throat. It becomes evident that areas in close proximity to the throats are the most prone to particle agglomerations, leading to pressure drops over time. The formation of particle clusters within the pore throats intensifies with both an increase in the number of particles and fluid velocity from 0.001 m/s to 0.01 m/s . Nevertheless, low flow rates (0.001 m/s) are insufficient to mitigate blockages.

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Primary author: Mr GHODSI, Mohammad (Institute of Petroleum Engineering, School of Chemical Engineering, Faculty of Engineering, University of Tehran)

Co-author: Dr RASAEI, Mohammad Reza (Institute of Petroleum Engineering, School of Chemical Engineering, Faculty of Engineering, University of Tehran)

Presenter: Mr GHODSI, Mohammad (Institute of Petroleum Engineering, School of Chemical Engineering, Faculty of Engineering, University of Tehran)

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