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Formation factor in Bentheimer and Fontainebleau sandstones:  
Theory compared with pore-scale numerical simulations

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**Highlights**

- Formation factors determined by theory are compared with digital rock models results
- Universal power law from percolation theory accurately estimates formation factor in network models
- Power-law scaling crosses over to the linear scaling near the porosity of 0.75 in grid models
- Disregarding the effect of critical porosity yields inaccurate formation factor estimations in low-porosity sandstones

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