144s Scalable Drag Law for Bubble Columns

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Industrial bubble columns are mainly operated in churn-turbulent regime where bubble diameter depends on gas inlet flow rate and presence of catalyst particles in continuous phase. A CFD model has been devised to simulate industry relevant churn turbulent bubble columns. The model includes Population Balance equation to predict Sauter diameter evolution, which accounts for catalyst particle presence. The Sauter bubble diameter is used to calculate drag law. The drag law correctly reproduces bubble rising velocity for all bubble sizes and accounts for bubble concentration effects. 3D time dependent simulation was performed to validate the model against experiment. It was found that drag law correctly reproduces bubble holdup for different gas inlet flow rates and catalyst particle concentration.