CFD Simulations of The Supercritical Water Oxidation Reactor System

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Computational Fluid Dynamics (CFD) has been used as an important tool for the design and optimization of chemical process. Although it is not possible to leave out real experiments, numerical experiments using CFD allow the determination of certain trends and give an insight into the physics of complex problems that would be impractical to study experimentally, i.e. confined to high experimental costs or even impossible to measure. However, physical or transport properties, such as density, viscosity, thermal conductivity, diffusivity and specific heat, show a tendency to change drastically near critical point as mentioned above. These sudden changes cause the convergence problem and the increase of uncertainty to the CFD simulation results of the supercritical fluid process.

In this work, we investigated the applicability of the CFD simulations of the supercritical fluid process using commercial CFD software, Fluent 6.2. Physical property model would be provided as a function of temperature at constant pressure for SCWO reactor system.