

Sensitivity Analysis of Property Parameters for Carbon Dioxide Capture Process

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A major disadvantage, the high energy consumption in the capture process by chemical absorption, may be reduced significantly via improved design and control. For improved design and control, a model that is both sufficiently accurate and computationally feasible is needed. The objective of this study is to develop a model for the integrated process and use sensitivity analysis (1) to find a tradeoff between its property model's complexity and the resulting accuracy of the economic evaluation, and (2) to define the tolerable limits of uncertainty in the key property parameters. Sensitivity analysis intends to describe how much a model's key output values are affected by changes in its input values. Base case design simulations for the MEA process are implemented in gPROMS. This design provides the reference point for the sensitivity analysis. Property parameters are perturbed in simulation and sensitivities of the evaluated economic value to the property parameters are calculated. This in turn gives a tolerable limit of uncertainty for each property parameter for specified acceptable variations in the evaluated economics. This study is useful in deciding which property should be measured with high accuracy, which can be estimated roughly.