Simulated Economics Assessment of Hollow Fiber CO_2 Separation Modules

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So far various membrane separation schemes for the recovery of CO2 have been proposed but economic analysis of these methods have not received much attention. In this work various conditions under which the hollow fiber membrane separation system would be the optimal selection are investigated in terms of cost effectiveness. The effects of different configurations such as singles-stage, two-stage and three-stage CO2 separation processes are examined using numerical simulations. In particular, the hollow fiber membrane processes for CO2 separation with vacuum pumps, heat exchangers, coolers and compressors to provide pressurized feed streams are analyzed. Operating costs are evaluated and compared numerically for the processes with and without recycle streams to compare feasibility for commercial implementation while maintaining the purity and recovery ratio as high as possible.