

### **589c New Concepts for Separation and Purification of Biomass-Derived Streams**

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The pathways for making fuel ethanol from renewable resources have been well defined, and technical feasibility has been proven. However, economic feasibility appears to be marginal, especially for demonstration plants. Recovery of value-added products from various stages of biomass conversion should favorably affect the overall process economics. Availability of robust technologies capable of delivering the desired separations is of critical importance. Results of a four-year DOE-sponsored study will be presented, in which several innovative technologies have been developed and tested using model biomass streams as well as corn stover hydrolysate obtained from the NREL pilot installation. Particular attention has been paid to long-term pilot testing to assure trouble-free full-scale implementation. The concept of erosion resistant membranes has been introduced, where membrane substrate is impregnated with finer particles responsible for fine filtration. Material free of suspended solids has been subjected to several versatile ion exchange and chromatographic separations. It was demonstrated that significant cost savings could be achieved by using innovative fractal fluid distribution systems. Application of fractal equipment coupled with use of fine separation media present new opportunities for efficient separation and purification of intermediates and chemical building blocks. Potential separations will be discussed as well as hurdles to overcome on the way to large-scale pilot testing and implementation.