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Polymer-Derived Membranes for Large Scale Energy-Efficient Separations

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A significant fraction of global energy is consumed to meet separation and purification needs of society, since existing processes are based primarily on energy intensive operations such as distillation. In fact, movement to alternative raw material sources tends to increase this consumption, since separation needs are more difficult to meet in such cases. Energy intensity and carbon dioxide emissions associated with many large scale separations can be reduced by a full order of magnitude by substituting membrane processes for traditional thermally-driven separation approaches. This presentation will provide a framework illustrating how such a strategy can be applied. An advanced manufacturing perspective relying upon polymer-derived materials is stressed within this framework.