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Energy analysis of Bio-ethanol Dehydration Using Pervaporative Processes

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Abstract

Environmental effects and health hazards posed by fossil-fuel based technologies complemented by changes in the global economy have increased the demand for “cleaner” and more efficient technologies. Developments in technologies that rely on renewable or synthetic resources have therefore become more relevant in today’s economy and current industrial outlook. An alternative, commonly referred to as bio-fuels, has significantly matured and brought the significance of producing ethanol from renewable resources to the forefront in energy R&D. Moreover, the potential of ethanol to be further converted to hydrogen makes it a very attractive alternative to replace or complement fossil fuels as sources of energy. One of the major hindrances in advancing bio-fuels in general, and ethanol technologies in particular, are the costs involved in one of the critical steps in reaching fuel-grade standards: the dehydration stage. This study focuses on a critical assessment of pervaporation as a dehydration technique in the production of ethanol from sugar-cane. Energy demands of various separation schemes using this technique are evaluated.