

## Current status and prospects of bioethanol process developments in the U.S.

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Lignocellulose indicates the complex of cellulose, hemicellulose and lignin, which occurs as the main composition of plants and trees in nature. Due to the largest quantity of cellulose as a renewable biomass resource on earth, the importance of converting lignocellulose into fuels and chemicals has long been emphasized. In the U.S., there have been continued efforts to develop economically-feasible processes for producing fuel ethanol from lignocellulosic biomass (i.e., bioethanol) since the oil crisis of early 1970's, which has been led by National Renewable Energy Laboratory (NREL), Golden, Colorado, a national laboratory operated for U.S. Department of Energy (DOE). The bioethanol and biobased products, which can benefit the environment and the sustainability of energy supply, moving into a new phase since the U.S. president issued an executive order to develop and promote biobased products and bioenergy in 1999. According to this law, the efforts in developing biobased products and bioenergy, which were spreaded throughout many federal government agencies, are integrated into one place by founding the National Bioenergy Center in 2001. Recently, eight U.S. universities were awarded grants from DOE for the establishment of education and research programs for biobased products industry. Currently in the U.S., 1-2% of liquid fuels and 10% of organic chemicals are produced from bioresources. They have established a vision to increase the production of liquid biofuels and biobased organic chemicals: providing 25% of fossil fuels-based industrial feedstock chemicals and 10% of liquid fuels from a biobased products industry and eventually satisfying more than 90% of U.S. organic chemical consumption and up to 50 percent of the liquid fuel needs with biobased products. In this presentation, the overview of present status and prospects of bioethanol and biobased products process developments in the U.S. and some of relevant detailed R&D efforts including the current process economics of bioethanol, hemicellulosic sugar recovery process, pretreatment reactor configuration, improvement of corn dry mill process, a novel biopretreatment, etc.