Section: BIOFUELS
Catalyst Types and Conditions for Use in Producing Biofuels

	Biological Catalysts	Chemical Catalysts
Products	Alcohols	A Wide Range of Hydrocarbon Fuels
Reaction Conditions	Less than 70ºC, 1 atm	10-1200ºC, 1-250 atm
Residence Time	2-5 days	0.01 second to 1 hour
Selectivity	Can be tuned to be very selective (greater than 95%)	Depends on reaction. New catalysts need to be developed that are greater than 95% selective.
Catalyst Cost	$0.50/gallon ethanol *(cost for cellulase enzymes, and they require sugars to grow) $0.04/gallon of corn ethanol*	$0.01/gallon gasoline *(cost in mature petroleum industry)*
Sterilization	Sterilize all Feeds *(enzymes are being developed that do not require sterilization of feed)*	No sterilizaton needed
Recyclability	*Not possible*	Yes with Solid Catalysts
Size of Cellulosic Plant	2,000-5,000 tons/day	100-2,000 tons/day

Source:

NSF. 2008. *Breaking the Chemical and Engineering Barriers to Lignocellulosic Biofuels: Next Generation* Hydrocarbon Biorefineries, Ed. George Huber. University of Massachusetts Amherst. National Science Foundation. Bioengineering, Environmental, and Transport Systems Division. Washington D.C.