Abstract
Process Economics Program Report 268
HIGHER ALCOHOLS FROM SYNGAS, TECHNOLOGY SURVEY
(December 2009)

This report reviews the current state of the patent literature concerning direct alcohol synthesis, homologation, hydroformylation, and miscellaneous associated concepts. For each topic, trends are noted whenever possible, and ideas for potential future evaluations of technology are suggested.

Most aspects of direct alcohol synthesis are stagnant, though recent patent applications direct mixed alcohols could be evaluated. The concepts are more amenable to fuel alcohols, than isolated pure alcohols, so the limitation of stranded gas fields should be avoided until the process concepts are understood.

Homologation patent developments are also largely stagnant. Recent activity with C2-C4 mixed oxygenates center on process configuration rather than conversion and yield, but the processes could be evaluated. General alcohol homologation would be a desirable category to see new results in, but activity is even lower there than other areas.

Hydroformylation at a limited stranded gas field is likely not viable since it would rely on obtaining an olefin economically. Since a remote location would require generation of the olefin on-site, the scale would need to be large to make economical olefins. Recent developments imply hydroformylation in general should be evaluated though, as long as the limitation of the strand gas field concept is dismissed. Such a report (Oxo Alcohols) is planned for the 2010 PEP program.

Of the array of concepts under the Related Technology heading, hydrogenation ideas are marginal with few developments. Methanol is periodically evaluated in its own series, the most recent of which was a 2006 report. Dimethyl ether/methanol developments are modest and do not justify near term evaluation. Alcohol products via methanol, formaldehyde or epoxide all show limited development. The epoxide category shows the most activity, but the audience would likely be narrow, so none of those concepts have a high priority. Olefins from syngas via alcohols shows recent developments, but the focus is on the olefin derivatives, not the alcohols. Olefin developments warrant attention, but not for an alcohols study, unless it was part of an integrated process. Miscellaneous concepts and equipment and process technology indicate a modest number of ideas, but none justifies evaluation because the ideas are largely incremental and wouldn't impact a conceptual design level evaluation. Alcohol related fuels technology shows little recent developments, so the concept does not justify evaluation. Coproduct and cogeneration though to show recent activity, so combined facilities warrant some attention. A report on alcohols and cogenerated electricity is planned for the 2010 PEP program.
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