Process technology

BP acetic acid 'breakthrough'

Cath O'Driscoll

BP has announced what it says is the 'biggest breakthrough' in acetic acid manufacture in 40 years, with the development of a process starting from a new syngas feedstock (a mixture of carbon monoxide and hydrogen). The process, *Saabre,* will reduce acetic acid production costs by more than $50/t, according to BP, which expects to reveal plans for 'the first deployment of the technology' in the first half of 2014.

The traditional route to produce acetic acid involves the carbonylation of methanol, which has been used since the 1970s. However, this route is now 'approaching the limits of its fundamental chemistry', said BP chief executive Nick Elmslie, speaking at a press conference in London in November 2013. Current approaches are already approaching the stoichiometric ratio of 0.533t methanol to make 1t acetic acid, Elmslie pointed out.

Instead, by using syngas as a feedstock – derived from a variety of hydrocarbons such as natural gas – *Saabre* produces acetic acid in an integrated three-step process that avoids the need to purify carbon monoxide or purchase methanol. The process has already been implemented at demonstration scale.

'We are [also] excited about the development potential of this technology for the production of additional products such as methanol and ethanol,' Elmslie said. Acetic acid is a versatile chemical intermediate used in a variety of products such as paints, adhesives and solvents as well as in the production of PTA for polyester manufacture.

Details of the new process and catalyst system remain proprietary. However, BP's head of technology, downstream, Charles Cameron, explained that no iodides are involved in the process which has traditionally restricted the technology to using expensive zirconium based catalysts.

Also at the press conference, BP revealed a separate process – *Hummingbird* – for the direct conversion of ethanol to ethylene by dehydration. The new process is aimed at organisations seeking incremental 50-300t/year increases in ethylene capacity, particularly in locations with access to ethanol such as Brazil, Cameron explained.

It could also be used to produce bioethylene for which current global capacity stands at around 0.5m t/year, against *ca* 145mt/year ethylene; however 'this could easily quadruple' in the next few years, he pointed out.

The technology could reduce transportation involved in shipping this important polymer building block around the world, for example, in the production of polyethylene terephthalate (PET) for bottle manufacture, Elmslie noted. Overall yields of more than 99% are achieved and the process can be performed with various grades of ethanol feedstock.

Again, cost savings of more than $50/t are anticipated, according to BP. *Saabre* is planned for deployment in future acetic acid plant investments, while *Hummingbird* will be licensed out to interested parties. Both processes were developed at BP's research and technology centre (HRTC) and its acetic acid manufacturing plant – Europe's largest – in Saltend, Hull, UK.

Michael Ellis
director, Ellis IP

Patrolling the patent trolls

Non-practising entities (NPEs) are organisations that develop or acquire patents and seek to 'monetise' them without any intention to manufacture. Clearly this sort of activity is dreadful. We want companies to make things, don't we?

This NPE problem could be addressed by requiring that only entities that make products covered by their patents may sue under them. But there are two types of NPE. There's the aggressive nuisance litigator that launches spurious claims against operating companies to extract (extort) licence revenues. The patent trolls (*C&I*, 2013, **7**, 37). Then there is the 'innovation entity', which includes universities, research institutes and creative start-ups, responsible for disruptive and transformative innovations.

The proposed legislation brought by US Representative Bob Goodlatte would shift the financial burden by allowing costs to be awarded to the successful defendant. Currently, there is no disincentive to spurious infringement claims in the US; even a successful defendant pays its own costs. The legislation would also require detailed specification of the patents, claims and products at issue. And the America Invents Act in 2012 prohibited the inclusion of multiple alleged infringers in the same suit. A powerful weapon for the nuisance litigator will have been disarmed.

So, we can thwart that bad patent asserter without harming the welcome efforts of the innovator. But is it so clear cut? Patent trolls have to acquire patents from individual inventors, small companies and universities and so return funds to the invention creators. Eolas, a company formed by Michael Doyle, was vilified as a troll that was going to bring down the internet. It brought actions against Microsoft – which settled for $100m – and others before its patents, for dynamic pop-up windows in browsers, were found invalid. But $30m was returned to co-plaintiff, the University of California, which presumably can be used to develop new technologies and educate students.

Kodak emerged from bankruptcy in 2013 in part thanks to the sale of its digital imaging patent portfolio. Who bought it? NPE Intellectual Ventures, in a financing/licensing deal with Google, Apple and others, which gave them access to the technology without paying over the odds in a public auction. Wins all round, it would seem.

Then there are Mass Patent Aggregators, a further category of NPE. These consortia, established by manufacturers, acquire strategic patent portfolios to prevent them falling into the hands of 'trolls', who would otherwise assert the patent rights against their members. And national patent aggregators are emerging – France Brevets was established in 2011 to mutualise resources to better promote patent rights.

So it's not at all black and white. If the patent system really is broke, then I suggest we continue to plaster over the cracks. The proposed US patent bill is not a bad start. ●